



Southern African Plant Red Data Lists

Edited by Janice Golding



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Quick Reference Guide

Summary of IUCN 1994 Red Data List Categories Used in this Book

EX	Extinct	A taxon is Extinct when there is no reasonable doubt that the last individual has died.
EXW	Extinct in the Wild	A taxon is Extinct in the wild when it is known only to survive in cultivation, in captivity or as a naturalised population (or populations) well outside the past range. A taxon is presumed extinct in the wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual.
CR	Critically Endangered	A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future.
EN	Endangered	A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future.
VU	Vulnerable	A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future.
LR	Lower Risk	A taxon is Lower Risk when it has been evaluated, does not satisfy the criteria for any of the categories Critically Endangered, Endangered or Vulnerable. Taxa included in the Lower Risk category are separated into two subcategories:
LR-nt	Lower Risk–Near Threatened	Taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable.
LR-lc	Lower Risk–Least Concern	Taxa which do not qualify for Conservation Dependent or Near Threatened.
DD	Data Deficient	A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate.

Criteria for the *Critically Endangered*, *Endangered* and *Vulnerable* Categories

	Critically Endangered	Endangered	Vulnerable
A Declining Population Population decline rate at least	80% in 10 years or 3 generations using either or based on a direct observation b an index of abundance appropriate for the taxon c a decline in area of occupancy, extent of occurrence and/or quality of habitat d actual or potential levels of exploitation e the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites	50% in 10 years or 3 generations 1 population reduction observed, estimated, inferred, or suspected in the past 2 population decline projected or suspected in the future	20% in 10 years or 3 generations
B Small Distribution and Decline or Fluctuation Either Extent of Occurrence or Area of Occupancy and two of the following three: 1 either severely fragmented or known to exist at x locations 2 continuing decline at in any of the following:	< 100 km ² < 10 km ² $x \leq 1$ any rate a extent of occurrence b area of occupancy c area, extent and/or quality of habitat d number of locations or subpopulations e number of mature individuals	< 5,000 km ² < 500 km ² $x \leq 5$ any rate	< 20,000 km ² < 2,000 km ² $x \leq 10$ any rate
3 fluctuating in any of the following:	> 1 order of magnitude a extent of occurrence b area of occupancy c number of locations or subpopulations d number of mature individuals	> 1 order of magnitude	> 1 order of magnitude
C Small Population Size and Decline Number of mature individuals and one of the following two: 1 rapid decline rate of at least 2 continuing decline and either a fragmented or b all individuals in a single sub-population	< 250 25% in 3 years or 1 generation any rate all sub-pops < 50	< 2,500 20% in 5 years or 2 generations any rate all sub-pops < 250	< 10,000 10% in 10 years or 3 generations any rate all sub-pops < 1,000
D Very Small or Restricted Either 1 number of mature individuals or 2 population is susceptible	< 50 (not applicable)	< 250 (not applicable)	< 1,000 area of occupancy < 100 km ² or number of locations < 5
E Quantitative analysis Indicating the probability of extinction in the wild to be at least	50% in 10 years or 3 generations	20% in 20 years or 5 generations	10% in 100 years

For more detailed information on the IUCN categories, see the Appendices:

- For detailed information on the IUCN 1994 categories, see Appendix 1.
- For detailed information on the IUCN 1994 categories in Portuguese, see Appendix 2.
- For detailed information on the IUCN 2001 categories, see Appendix 3.
- For guidelines on applying the 1994 categories, see Appendix 4.
- For guidelines on applying the 2001 categories at a national level, see Appendix 5.

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*Southern African
Plant Red Data Lists*





Southern African Plant Red Data Lists

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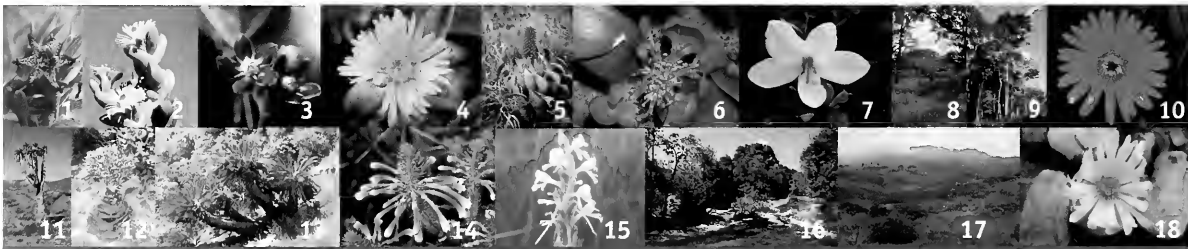
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1. *Ferraria schaeferi*. (Photo: G. Owen-Smith)
2. The erect form of *Juttedinteria deserticala*. (Photo: G. Williamson)
3. *Mondia whitei*, Swaziland. (Photo: NBI)
4. *Astridia citrina*, South Africa. (Photo: NBI)
5. *Alae peglerae*, South Africa. (Photo: NBI)
6. *Daubenya aurantiaca* var. *coccinea*, South Africa. (Photo: NBI)
7. *Bauhinia natalensis*, South Africa. (Photo: NBI)
8. High-rainfall miombo woodland in north-eastern Zambia. (Photo: J. Burrows)
9. Grassland-forest interface in Mwinilunga, Zambia. (Photo: J. Burrows)
10. *Gerbera aurantiaca*, South Africa. (Photo: NBI)
11. *Alae pillansii*, Namibia. (Photo: NBI)
12. *Baophane disticha*, Lesotho. (J.S. Golding)
13. *Encephalartos brevifoliolatus*, South Africa. (Photo: NBI)
14. *Erica parteri*, South Africa. (Photo: NBI)
15. Quartzite ridges, Chimanimani, Zimbabwe. (Photo: J. Timberlake)
16. Zambezi Rapids, Zambia. (Photo: J. Burrows)
17. Landscape in Nyanga (World's View), Zimbabwe. (Photo: J. Timberlake)
18. *Canophytum* sp. (Photo: NBI).

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Contents at a Glance

Acknowledgements	ix
Foreword	x
Abbreviations & Acronyms	xi
Introduction	1
Regional Overview	2
Angola (English)	8
Angola (Português)	12
Botswana	16
Lesotho	21
Malawi	31
Mozambique (English)	43
Moçambique (Português)	46
Namibia	61
South Africa	93
Swaziland	121
Zambia	135
Zimbabwe	157
References	183
Appendix 1. 1994 IUCN Red List Categories	187
Appendix 2. 1994 Categorias da Lista Vermelha da IUCN	193
Appendix 3. 2001 IUCN Red List Categories	201
Appendix 4. 1994 Application of IUCN 1994 Red List Criteria	212
Appendix 5. Application of IUCN 2001 Red List Criteria	219
Index	226



Contents

Acknowledgements	ix
Foreword	x
Abbreviations & Acronyms	xi
Introduction	1
Overview	1
Country Chapters	1
Red Data Lists	1
Index	1
Appendices	1
Database on CD	1
Regional Overview	2
Introduction	2
Focal Species	2
Methods	3
Results	6
Conclusions	7
Angola (English)	8
Introduction	8
Background	9
Red Data Lists for Angola	10
Threats to Plant Species in Angola	11
Angola (Português)	12
Introdução	12
Generalidades do País	13
Alguns Aspectos Ligados a Legislação Sobre a Conservação da Vegetação em Angola	14
Listas de Plantas Ameaçadas em Angola	15
Principais Causas de Ameaça das Plantas em Angola	15
Botswana	16
Introduction	16
Methods	16
Results and Discussion	16
Conclusions	17
Red Data List	18
Lesotho	21
Introduction	21
Geology	21
Climate	22
Vegetation Types	22
Lesotho Plant Recording	22
Red Data Lists	23
Methods	24
Results and Discussion	24
Conclusions	24

Red Data List	25
Malawi	31
Introduction	31
Methods	32
Results and Discussion	32
Conclusions	33
Red Data List	34
Mozambique (English)	43
Introduction	43
Methods	44
Results and Discussion	44
Conclusions and Recommendations	45
Moçambique (Português)	
Introdução	46
Metodologia	46
Resultados e Discussão	47
Conclusões e Recomendações	48
Red Data List/Lista Vermelha	49
Namibia	61
Introduction	61
Methods	61
Results and Discussion	62
Conclusion	63
Red Data List	64
South Africa	93
Introduction	93
Methods	93
Results and Discussion	93
Conclusion	94
Red Data List	95
Swaziland	121
Introduction	121
Methods	122
Results and Discussion	122
Conclusion	123
Red Data List	1240
Zambia	135
Introduction	135
Methods	136
Results and Discussion	136
Conclusion	139
Red Data List	140
Zimbabwe	157
Introduction	157
Methods	157
Results	158
Discussion	159
Red Data List	161
References	183
Appendix 1. 1994 IUCN Red List Categories	187
I) Introduction	187
References	187
II) Preamble	187
III) Definitions	190
IV) The Categories	191
V) The Criteria for Critically Endangered, Endangered and Vulnerable	191
Appendix 2. 1994 Categorias da Lista Vermelha da IUCN	193
I. INTRODUÇÃO	193
Referências	194
II. PREÂMBULO	194
III. DEFINIÇÕES	197
IV. AS CATEGORIAS	198
V. OS CRITÉRIOS PARA AS CATEGORIAS EM PERIGO CRÍTICO, EM PERIGO E VULNERÁVEL	198

Appendix 3. 2001 IUCN Red List Categories	201
I. INTRODUCTION	201
II. PREAMBLE	202
III. DEFINITIONS	204
IV. THE CATEGORIES	206
V. THE CRITERIA FOR CRITICALLY ENDANGERED, ENDANGERED AND VULNERABLE	207
Annex 1: Uncertainty	209
Annex 2: Citation of the IUCN Red List Categories and Criteria	210
Annex 3: Documentation Requirements for Taxa Included on the IUCN Red List	210
References	211
Appendix 4. 1994 Application of IUCN 1994 Red List Criteria	212
Background	212
Draft Guidelines	212
The Categories	214
The Assessment Procedure	214
Discussion	217
Acknowledgements	218
References	218
Appendix 5. Application of IUCN 2001 Red List Criteria	219
Abstract	219
Introduction	219
Definitions	220
The Assessment	221
Priorities for Conservation	222
Documentation and Publication	223
Discussion	224
Acknowledgements	225
Literature Cited	225
Index	226

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Janice Golding
Pretoria
December 2001

Foreword

Biodiversity loss is one of the world's most pressing crises. Species are declining to critical population levels, important habitats are being destroyed, and ecosystems are being destabilised through climate change, pollution, alien invasive species, and direct human impacts. Yet there is also growing awareness of how biodiversity supports livelihoods, allows sustainable development, and fosters co-operation between nations. This awareness is promoted globally through products like the *IUCN Red List of Threatened Species*. Awareness is also generated at local levels through the production of regional and national Red Lists. The *Southern African Plant Red Data Lists* publication is an excellent example of such a contribution.

Red Data Lists are intended to be comprehensive and authoritative accounts of the global, regional or national conservation status of plants and animals. These publications help to convey the urgency and scale of conservation problems to the public and policy-makers, and are used to motivate the global community to take appropriate actions to reduce the loss of species. The Red Data Lists also help to establish conservation priorities at the local level and guide conservation actions.

The *IUCN Red List of Threatened Species* is compiled mainly through contributions from IUCN's 7,000 member Species Survival Commission (SSC) and partner organizations. However, regional and national Red List initiatives are making an increasingly important contribution to the IUCN Red List. Contributions from botanists on the state of Africa's plants have historically been very poor because of the lack of knowledge and lack of local capacity to collect such information. The IUCN's prototype Red Data Book *Animals and Plants Threatened with Extinction* produced in 1962, included a report on 'plants in danger' compiled by Noel Simon and Ronald Melville. African plants did not feature highly in this report, although *Encephalartos* and *Welwitschia* were mentioned. Similarly, Nigel Hepper's contribution, on the 'conservation of rare and vanishing plant species' in *The Red Book: Wildlife in Danger* produced by IUCN in 1969 does not mention any African plant species. A turning point came a year later, when data began to be more readily forthcoming. Ronald Melville included ten African plants in the *Red Data Book: Angiospermae* published by IUCN in 1970, nine of these plants were from South Africa. The trend continued with *The IUCN Plant Red Data Book* published in 1978, when Gren Lucas and Hugh Synge included accounts on 27 Sub-Saharan African plant species among the 250 accounts in the book. Fifteen of these species were from southern Africa. The southern African accounts were based on information provided by Anthony Hall and his co-

workers as a result of their pioneering efforts to compile the first list of *Threatened Plants of Southern Africa* in 1980.

Since the late 1970s, southern African botanists have made increasingly important contributions to the global IUCN Red Lists (1997–2000) through the ongoing compilation and publication of local, national, and regional Red Lists. Unfortunately, contributions from botanists to the north of the Limpopo River have been sadly lacking. This lack of input was certainly not because there were no conservation problems or that there was no awareness of the threats to species. In 1966, a symposium was held at the 6th meeting of the Association for the Taxonomic Study of the Flora of Tropical Africa (AETFA) in Uppsala, Sweden, which looked at the *Conservation of Vegetation in Africa South of the Sahara*. Although the symposium primarily focussed on the conservation of habitats and ecosystems, threats to species were mentioned in the proceedings, which were published in 1968. For example, the late Hiram Wild (1968 pp. 54) in discussing the status of conservation in what is now Zimbabwe said the following:

There has been some concern expressed in recent years by the hawking, mainly in towns, of indigenous plants dug up from the wild. These include *Gloriosa superba*, *Eulophia petersii*, *Ansellia nilotica*, *Phoenix reclinata*, *Hyphaene ventricosa*, *Adiantum capillus-veneris*, *Aloes* spp., and *Monadenium obesum* var. *multiflorum*. None of these plants is rare but continued depredations could be harmful even to large populations.

Almost 35 years later, the *Adenium* and 14 *Aloe* taxa are listed as threatened in the account for Zimbabwe in this new southern African Red Data List.

Following the conservation symposium in 1966, Inga Hedberg, a renowned Swedish botanist who has done much to promote taxonomy and plant conservation in Africa, made a concerted effort to gather information on threatened plant species in Africa. This was compiled as a set of preliminary lists of rare and threatened species for various African countries and published in the symposium proceedings *Systematic Botany, Plant Utilization and Biosphere Conservation* in 1979 (pp. 82–104). This publication included lists for Angola (albeit very limited), Lesotho, South Africa, Swaziland, and Zimbabwe. Botswana at that stage was thought not to have any threatened species (thirteen are now listed in the *Southern African Plant Red Data Lists*) and Mozambique was not even mentioned. The lists were given to the then IUCN Threatened Plants Committee and the informa-

tion was incorporated into the threatened plants database. These preliminary lists formed in part the basis for the first attempted complete listing of threatened plants in the 1997 *IUCN Red List of Threatened Plants*.

In the introduction to the preliminary lists, Inga Hedberg pointed out that two important prerequisites for plant conservation were sadly lacking in Africa. These prerequisites are a comparatively detailed knowledge of the flora and organizations to take care of this knowledge and act upon it. Although the exploration of the African flora continues, our knowledge today is still incomplete. Even areas that have been relatively well explored are still floristically poorly known. Similarly, although many countries now have organizations to take conservation action, this is still lacking in key areas or is non-functional. Even in cases where such organizations do exist and are active, very few are concerned with the conservation of vegetation let alone individual plant species. Steps to reverse this situation are being taken and the Southern African Botanical Diversity Network (SABONET) is leading the way. SABONET is developing a strong core of professional botanists, taxonomists, horticulturists and plant diversity specialists across all ten southern African countries. These people have been trained to compile inventories, to evaluate the conservation status of plant species, to monitor these species, and to help conserve the botanical diversity of the region.

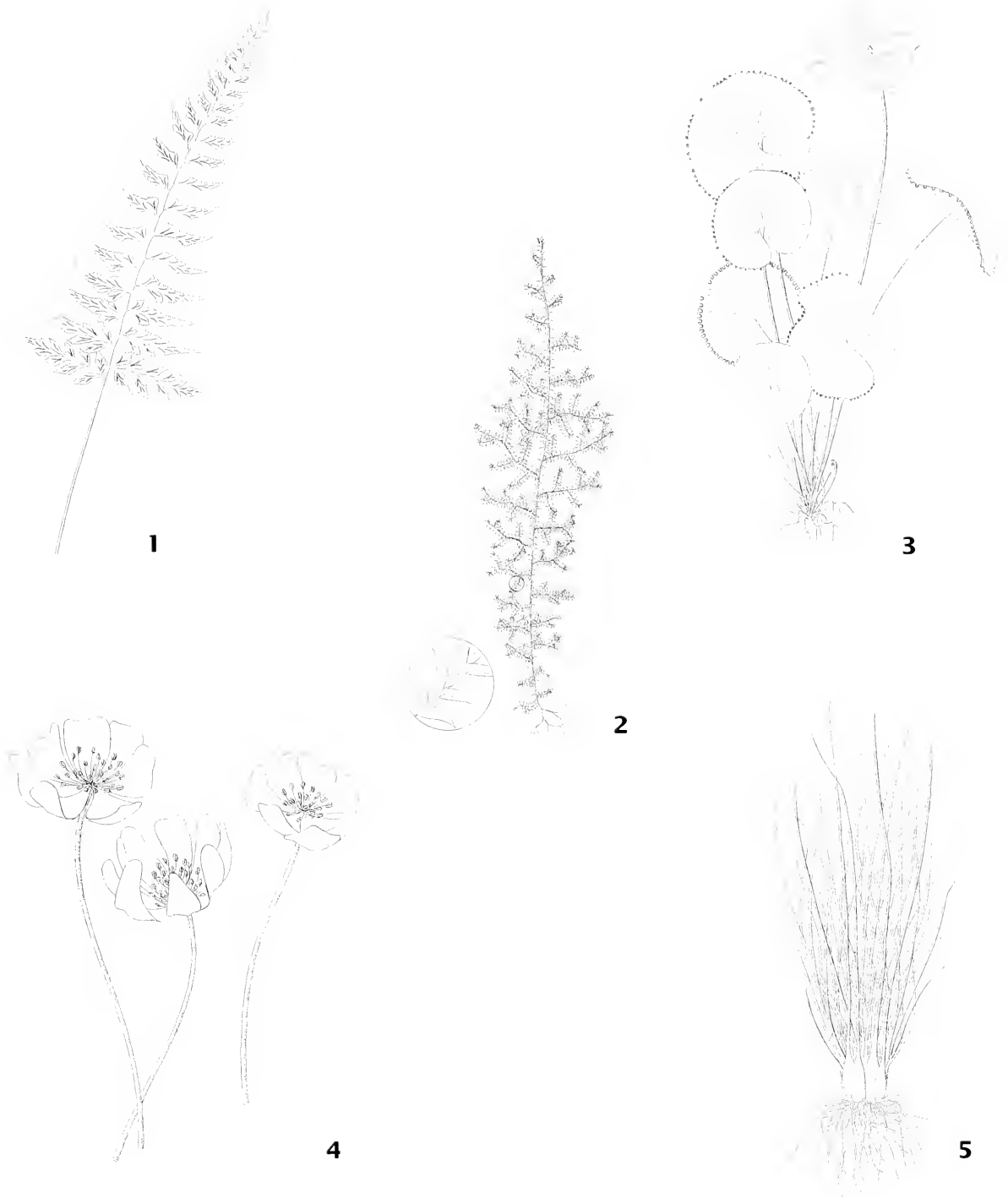
The capacity and competence that have been established through the SABONET project are clearly evident in the high quality content of the *Southern African Plant Red Data Lists*. Although we still have a long way to go in countries like Angola and Mozambique, a solid foundation for the future work has been laid. The co-ordinator, Janice Golding, and her team of national co-ordinators are to be congratulated on their perseverance to ensure participation and input from the region's botanists. In addition to producing the first-ever comprehensive and documented plant Red Data List for the whole region, a network of southern African threatened plant professionals has been established. This can only bode well for the future of plant conservation in southern Africa. Through projects like the SABONET Red Data List, southern Africa is taking its rightful place as a leader on the world-stage of plant conservation. The *Southern African Plant Red Data Lists* should be used as a model for what can be achieved elsewhere in Africa and even other parts of the world.

Craig Hilton-Taylor
IUCN Red List Programme Officer, Cambridge,
United Kingdom
October 2001



Abbreviations & Acronyms

AETFAT	Association for the Taxonomic Study of the Flora of Tropical Africa
a.s.l.	above sea level
CSIR	Council for Scientific and Industrial Research
DRC	Democratic Republic of Congo
EIA	Environmental Impact Assessment
FSA	<i>Flora of southern Africa</i>
FZ	<i>Flora Zambesiaca</i>
GEF	Global Environment Facility
ha	hectare
IUCN	World Conservation Union
IUCN/SSC	World Conservation Union/Species Survival Commission
IUCN-ROSA	World Conservation Union (Regional Office for Southern Africa)
IUCN TPC	World Conservation Union Threatened Plants Committee
K	Royal Botanic Gardens Kew, United Kingdom
km	kilometre
KZN	KwaZulu-Natal
LHWP	Lesotho Highlands Water Project
LMA	INIA Herbarium, Maputo, Mozambique
LMU	Eduardo Mondlane University Herbarium, Maputo, Mozambique
LUAI	Luanda Herbarium, Agostinho Neto University, Luanda Angola
m	metre
MAL	National Herbarium, Zomba, Malawi
mm	millimetre
NBRI	National Botanical Research Institute
NBI	National Botanical Institute, South Africa
NDO	Kitwe Herbarium, Division of Forestry Research, Zambia
NPGRC	National Plant Genetic Resources Centre (Namibia)
p.a.	per annum
PRE	National Herbarium, Pretoria, South Africa
PRECIS	National Herbarium (PRE) Computerised Information System
PSUB	Maun Herbarium, Botswana
RDL	Red Data List
ROML	National University of Lesotho Herbarium, Roma, Lesotho
RSA	Republic of South Africa
SABONET	Southern African Botanical Diversity Network
SADC	Southern African Development Community
SDNH	Swaziland National Herbarium, Malkerns Research Station, Mbabane, Swaziland
SNTC	Swaziland National Trust Commission
Spmndb	Specimen Database, used by WIND
SRGH	National Herbarium, Harare, Zimbabwe
TPC	IUCN Threatened Plants Committee
UCBG	University of Botswana Herbarium, Gaborone, Botswana
WIND	National Herbarium, Windhoek, Namibia
WCMC	World Conservation Monitoring Centre
WWF	World Wide Fund for Nature



1. *Asplenium torrei* (Mount Mulanje, Malawi).
2. *Selaginella subisophylla* (Ntumbachusi Waterfalls, Zambia).
3. *Adiantum reniforme* (Nyika Plateau, Malawi).
4. *Aponogeton ranunculiflorus* (Lesotho).
5. *Isoetes alstonii* (Victoria Falls, Zimbabwe).

(Drawings by Sandie Burrows)



Introduction

This short introduction will familiarise you with the structure and layout of the *Southern African Plant Red Data Lists*.

Overview

A regional overview by Janice Golding, SABONET's RDL Coordinator, gives background information on Red Listing in southern Africa and summarises the results for the entire region.

Country Chapters

Each country's RDL forms a separate chapter of the book, starting with a fact sheet and an overview, followed by the country's red-listed taxa. The fact sheet lists relevant country statistics and also summarises the RDL taxon numbers. Each chapter is identified by a colour-coded bar on the edge of the page, making it easy to find any particular country at a glance.

Red Data Lists

The list of taxa that follows a country's overview is arranged into three sections: **EXTINCT & THREATENED**, **LOWER RISK**, and **DATA DEFICIENT**. The **EXTINCT & THREATENED** section contains all *Extinct*, *Critically Endan-*

gered, and *Vulnerable* taxa. The **LOWER RISK** section comprises all taxa that were rated *Lower Risk*, with both *Near Threatened* and *Least Concern* subcriteria. The **DATA DEFICIENT** section contains all taxa with *Data Deficient* ratings.

IUCN 1994 categories were used for all assessments. A concise guide to the IUCN categories and subcriteria is printed on the inside front cover of the book, making it easy for non-specialists to interpret the IUCN assessments of plants in the lists.

The *Southern African Plant Red Data Lists* book contains information on approximately 4 100 assessments. For ease of use, the taxa are arranged alphabetically under families, which are also arranged alphabetically within each section. Under each taxon name, in addition to the IUCN assessment, the endemism, threats, and distribution of the taxon are given, where these are available. In most cases, there are also additional notes on the taxon.

Index

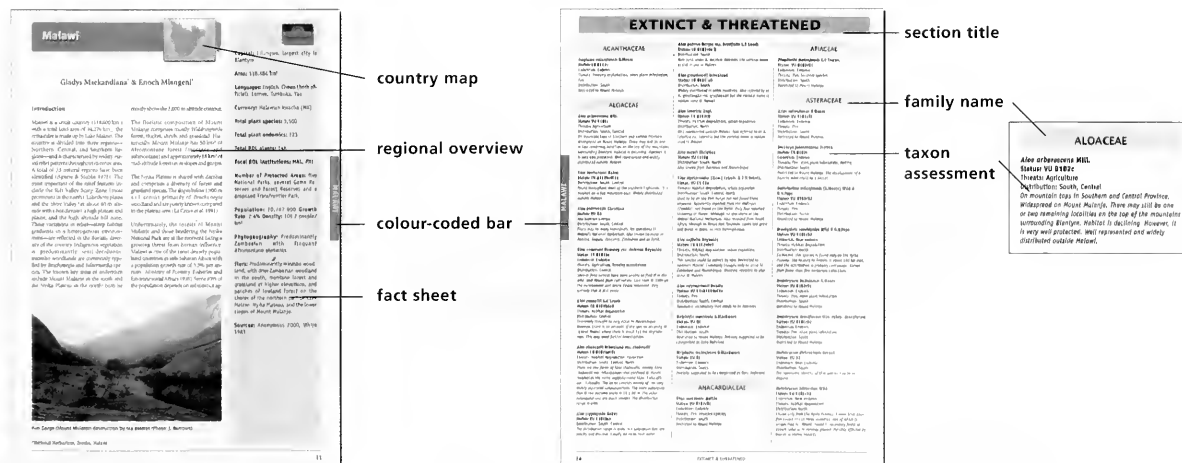
A detailed index lists all families, species, and synonyms that are found in the book.

Appendices

Appendices include the 1994 and 2001 IUCN Red List Categories in both English and Portuguese, as well as the IUCN Guidelines for National Application of IUCN Categories.

Database on CD

You can also order the full *Southern African Plant Red Data Lists Database*—on which this book is based—from SABONET. The database not only provides all the information contained in the Southern African Plant Red Data Lists book, but also lists additional data, such as extent of occurrence, population size, past decline, and future decline. The database features an easy-to-use search facility, enabling users to find, print, and export information on taxa. If you are interested in ordering the CD, send an e-mail message to redatallist@sabonet.org, including the phrase "Red Data List Order" in the subject line, and your name and mailing address in the body of the message. Alternatively, you can send a fax with the same information to (27) 12 804-5979, or write to Red Data List Orders, SABONET, National Botanical Institute, Private Bag X101, Pretoria 0001, South Africa.





Regional Overview

Janice Golding*

A Red Data List is a catalogue of species whose future survival in nature hangs in the balance. Species that are rare or those that are threatened with extinction are indicators of the state of ecosystem functioning and may signal the impending degeneration of biodiversity. Red Data Lists provide guidelines for *why* and *where* conservation efforts should be concentrated, and operate as an early-warning system at the level of species and their ecosystems.

The *Southern African Plant Red Data Lists* publication was compiled over a 30-month period and documents some 3,900 taxa that are threatened and potentially threatened with extinction in Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia, and Zimbabwe. A total of 4,098 assessments are included. More than 1,960 of these species occur only in a single country (endemic) and 33 are recorded as being extinct. Where possible, Portuguese translations have been made available to accommodate users in Angola and Mozambique.

Introduction

Hall, De Winter, De Winter & Van Oosterhout (1980) compiled the first plant Red Data List (RDL) in Africa; today, this list is still widely regarded as a milestone publication. It provided RDL accounts for Lesotho, Botswana, South Africa, Swaziland, and the former South West Africa (Namibia). These countries comprise a broad floristic region that is documented in the *Flora of southern Africa* (FSA) (current editor: G. Germishuizen). The FSA region generally covers the area south of the Kunene, Limpopo, and Okavango Rivers. The pioneering work of Hall *et al.* (1980) formed the basis of subsequent RDL

compilations in the FSA region and its neighbouring countries; several subsequent in-country RDLs were produced in South Africa, for example, Hall & Ashton (1983), Hall & Veldhuis (1985), and Fôurie (1986). During this time, the Threatened Plants Committee of the World Conservation Union (IUCN) also compiled lists of species suspected or known to be threatened; these were widely circulated to various countries throughout the southern African region. These lists were never formalised into publications until many years later when more reliable data sets were available.

By contrast to the FSA region, countries to the north of the Kunene, Limpopo, and Okavango Rivers did not produce RDLs during the 1980s. This area—referred to as the *Flora zambesiaca* (FZ) (current editor: G.V. Pope) region—covers Angola, Malawi, Mozambique, Zambia, and Zimbabwe. The FZ region, being more species-depauperate than the FSA region (*ca* 8,000 species compared to *ca* 23,800) (Morat & Lowry 1997), did not have proper plant RDLs prior to 1998, when global plant RDL publications covering the southern African region were published by the IUCN/Species Survival Commission (Walter & Gillett 1998,



The globally recognisable landscape of southern Africa, showing *Adansonia digitata*. (Photo: NBI)

Hilton-Taylor 2000a) and the World Conservation Monitoring Centre (Oldfield *et al.* 1998).

The 1990s brought a new era of Red Listing for plant species: compared to the previous decade when RDLs were compiled using herbarium specimen records as a prime source of information, the 1990s tapped a range of new information sources. RDL assessments were based not only on herbarium specimen information, but also on field evidence and participatory consultations with taxonomic specialists, thus producing marginally more robust RDLs, and at the same time also creating more awareness of RDLs. One of the Lists created during this new era—the regional work of Hilton-Taylor (1996a)—is still highly regarded as a flagship publication: it was not only taxonomically more rigorous compared to previous accounts, but also had a far higher number of species on the RDL for Botswana, Lesotho, Namibia, South Africa, and Swaziland. Hilton-Taylor's work was subsequently updated in journals (Hilton-Taylor 1996b, 1997). The most recently published southern African plant RDL was for KwaZulu-Natal Province (South Africa), Lesotho, and surrounding areas (Scott-Shaw 1999). South Africans therefore have a 20-plus year history in compiling RDLs not only for South Africa, but also for its sister countries.

The *Southern African Plant Red Data Lists* publication, produced under the auspices of the Southern African Botanical Diversity Network (SABONET), has been built on this impressive foundation.

Focal Species

The IUCN/Species Survival Commission

* SABONET Red Data List Coordinator, Pretoria, South Africa



C. Hilton-Taylor from the IUCN/SSC at a training course on the application of the IUCN's RDL system. (Photo: A. Romanowski)

advocates that the RDL status of all species, whether or not they are suspected of meriting RDL status, should be determined to create a benchmark for comparisons (Hilton-Taylor 2000b). The *Southern African Plant Red Data Lists* team was unable to undertake this formidable challenge—which would take many years to achieve—and instead adopted a strategic approach by focussing on certain species only.

Southern African Plant Red Data Lists workers placed special emphasis on revisiting the conservation status of species that appeared in previous RDL publications. This presented an opportunity to incorporate new sources of information to determine whether or not the conservation status of a taxon had actually changed with respect to extinction risk, and also provided an opportunity to reassess species that had previously been categorised as *Data Deficient* (no information available to assist in determining the RDL status). Consulting previous RDLs made it possible to combine old and new sets of information.

Species covered in the *Southern African Plant Red Data Lists* include the following:

- Socially and economically important species such as those used for medicinal purposes
- Species known or suspected to be utilised unsustainably
- Indigenous commercial timbers
- Taxonomically poorly known taxa
- Species of special botanical interest such as endemics or range-restricted species
- Species that are subject to poaching

Still, in most cases, rates of exploitation and trade statistics were not readily available, do not exist, are outdated, or incomplete.

Speculative RDL results were optimal in these cases. For example, the harvesting of Zambia's edible orchids, commonly called 'chikanda' or 'African polony', has to date not been formally documented at a species level (Bingham & Kokwe 2001, Ng'uni *et al.* 2001, Golding 2001). Orchid tubers need to be purchased from markets and then cultivated in order to use floristic diagnostics to identify which species are being utilised. In the meantime, field surveys by orchidologists will remain a priority in determining the actual conservation status of Zambian orchids. This classic example epitomises the need for basic levels of information of our region's indigenous resources in order to implement appropriate utilisation strategies. More accurate assessments of utilised species require better data sets that can only be acquired through

a combination of field monitoring and taxonomic efforts. This is an immediate priority, particularly for countries with resource-based economies.

Methods

IUCN RDL System of Categories and Criteria

The IUCN RDL system of categories and criteria (IUCN 1994) were used for the purposes of this publication (Appendix 1 in English, Appendix 2 in Portuguese). The *Lower-Risk conservation dependent* category was excluded, since species may well be prone to extinction and, simultaneously, their survival may be completely dependent on protective conservation measures. The system used consists of eight categories



The SABONET RDL Project was launched at a regional workshop held at the National Herbarium in Pretoria, South Africa. (Photo: A. Romanowski)

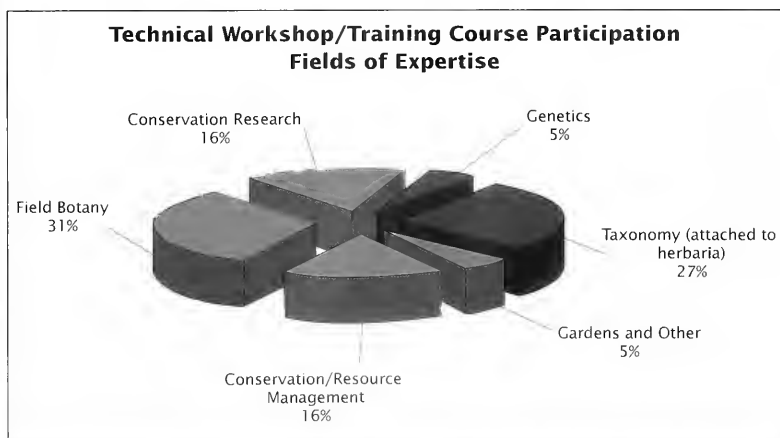


Figure 1. Collaborating partners came from a variety of professional backgrounds.

ries; the placement of a taxon in each category is justified according to certain criteria that apply. Species assigned as *Critically Endangered*, *Endangered* and *Vulnerable* are considered threatened.

Species were classified according to national guidelines outlined in Gärdenfors *et al.* (1999) (Appendix 3). When making a na-

tional RDL assessment, the entire global population and its interaction with resident national populations should be taken into account, as the dynamics of gamete exchange within a population spanning country borders may influence extinction risks in resident national populations. As a result, a single species may have different RDL assessments in different countries. In

instances where information regarding the population dynamics of a species across country borders was doubtful, allowable inferences and assumptions were made (Gärdenfors *et al.* 1999). Similarly, species categorised as being extinct in one country may not be extinct in another. Endemics (species confined to a particular country) are assigned the same status in global and national RDL assessments. When endemics are classified as extinct, it means that the species no longer exists anywhere or that it is known only *ex situ*.

Table 1. Key literature references used for compiling the southern African RDL. The references are listed according to order of greatest utility.

Literature	Relevant countries
<i>Flora zambesiaca</i>	Angola, Malawi, Mozambique, Zambia, Zimbabwe
<i>Flora of southern Africa</i>	Botswana, Lesotho, Namibia, South Africa, Swaziland
<i>Bothalia</i>	Botswana, Lesotho, Namibia, South Africa, Swaziland
<i>Flora of Tropical East Africa</i>	Malawi, Mozambique, Zambia
<i>Kew Bulletin</i>	Southern Africa
<i>Flora de Moçambique</i>	Mozambique
<i>Flowering Plants of Africa</i>	Southern Africa
<i>Kirkia</i>	Zimbabwe
<i>Conspectus floraе angolensis</i>	Angola

Table 2. Threat categories used in the RDL assessments.

Afforestation (associated with establishing timber plantations)
Agriculture
Alien plant infestation
Collection (associated with the removal of whole plants, e.g. medicinal, poachers)
Damming
Deforestation (land clearing of woody cover)
Desiccation (drying of wetlands)
Fire
Forestry exploitation (targeted removal of woody species)
Grazing (e.g. goats and cattle) or browsing (e.g. elephants)
Habitat degradation (applied in general or specific terms)
Harvesting (associated with the removal of certain plant parts, e.g. medicinal)
Mining
Pests/pathogens
Road network
Salinisation
Siltation
Soil erosion
Urban expansion (applied to expanding human settlements)

Table 3. Summary of regional statistics for taxa on the Southern African Plant RDL.

Category	Number of taxa
Extinct (EX)	32
Extinct in the Wild (EX)	1
Critically Endangered (CR)	138
Endangered (EN)	230
Vulnerable (VU)	1,018
Lower-Risk near threatened (LR-nt)	361
Lower-Risk least concern (LR-lc)	1,130
Data Deficient (DD)	1,188
Not endemic	1,446
Endemics	1,962
Suspected endemics	148
Near-endemics	475
Suspected near-endemics	67
Total number of assessments	4,098

The IUCN (1994) RDL system has in the meantime been refined through extensive consultation and has now been replaced with a new system (IUCN 2001) (Appendix 4, currently unavailable in Portuguese). The most significant difference between the IUCN 1994 system and the IUCN 2001 system is that the latter places greater emphasis on measures of population decline and whether threatening processes contributing to these declines can be alleviated, leading to the stabilisation or recovery of the population (reversible and irreversible population declines). The guidelines for applying this system at a national level have also been updated (Gärdenfors *et al.* 2001) (Appendix 5).

Sources of Information

As part of the SABONET RDL programme, training courses and technical workshops were conducted throughout the region, primarily between May 2000 and May 2001. These events provided a foundation for understanding RDL methodology and the opportunity to consult with and obtain consensus from specialists regarding the conservation status of species. This level of consultation, which took place locally, regionally, and internationally, greatly enhanced the quality of the data, as information was reported from the perspective of individuals who had observed species in the



Bauhinia natalensis is a South African endemic that is more commonly known from cultivation. (Photo: NBI)



The ten countries covered by the SABONET RDLs.

field (Figure 1, p.3). Most collaborators outside the workshops were field ecologists, taxonomists, and, particularly, amateur botanists. Over and above the participation of individuals at the technical workshops

and training courses, the RDL was refined mainly by taxonomists—the voluntary contributions of staff at the National Herbarium in South Africa (PRE), Kew Herbarium (K), and the National Herbarium

Table 4. Comparison of numbers of species listed in different RDL accounts.

Country	Oldfield <i>et al.</i> 1998	Walter & Gillett 1998	Hilton-Taylor 2000a	SABONET RDL
Angola	27	30	25	n/a
Botswana	3	7	3	43
Lesotho	0	25	0	94
Malawi	27	61	18	247
Mozambique	78	89	68	300
Namibia	11	75	12	1,152
South Africa	65	2,215	72	948
Swaziland	8	42	8	305
Zambia	14	12	11	505
Zimbabwe	27	100	22	504

Table 5. The ten families with the highest representation on the Southern African Plant RDL.

Family	Number of taxa
Orchidaceae	403
Asteraceae	378
Apocynaceae <i>sensu lato</i>	284
Fabaceae	223
Euphorbiaceae	197
Rutaceae	164
Mesembryanthemaceae	161
Asphodelaceae	159
Amaryllidaceae	142
Rubiaceae	129



The large-sized tubers of edible orchids are preferred and therefore more prone to over-exploitation. (Photo: M.G. Bingham)

of Zimbabwe (SRGH). Technical support on the IUCN RDL systems was provided by SABONET in consultation with the IUCN/SSC. All these processes collectively contributed to a considerable improvement of data coverage and quality.

Usually, national flora checklists are the logical starting point for the compilation of RDLs. However, with the exception of Namibia (Craven 1999 and updated in Craven 2000a, b) and South Africa (Arnold & De Wet 1993), the participating countries did not possess comprehensive published checklists. The absence of national checklists was a serious obstacle, as there was no logical reference point for species occurrences in a country or the taxonomic identity of the species in question. In lieu of checklists, the next best reference point was thought to be the Flora volumes pertaining to the FZ and FSA regions; FZ region countries relied heavily on FZ volumes as a surrogate for estimating distribution ranges and scarcity. Unfortunately, Flora volumes were found to be of limited value for RDL compilation in Malawi, Mozambique, Zambia, and Zimbabwe. To remedy this limitation, we published a list of recommendations regarding the format of Flora volumes so that Floras would, in future, be more useful for Red Listing and other conservation-related purposes (Golding & Smith 2001).

However, a very positive outcome of using FZ was that many poorly known species documented in FZ (known only from type collections or from a type locality) were included in the *Southern African Plant Red Data Lists*. For example, one of the most extreme cases is that of *Eulophia biloba* Schltr. (Orchidaceae) from Mozambique—it was collected in 1895 and is known only from the type collection. The species was



SARARES THREATENED TAXON

This taxon is databased. All additions and changes should be sent to the SARARES Project Coordinator, Threatened Plants Project, Conservation Biology, National Botanical Institute, P/Bag X7, Claremont, 7735.

Creating more opportunities for contributing to the RDLs: stickers used on herbarium sheets alert herbarium users that the species is on the RDL.

collected in what is now a rapidly expanding coastal town (Beira), but has never been re-collected. There are hundreds of similar examples throughout the southern African region. This certainly highlights the need for greater and more focussed taxonomic activity in southern Africa.

In addition to FZ and FSA, a number of literature sources were found to be extremely useful for Red Listing purposes in southern Africa (Table 1). *Conspectus florum angolensis*, an account of the flora of Angola, has long ceased to be active; civil war and political instability have resulted in botanical work grinding to a halt (Huntley & Matos 1994). After many years of dormancy, *Flora de Moçambique*, an account of Mozambique's flora, is gradually being resuscitated.

Taxonomy

The taxonomic standard that was applied in the *Southern African Plant Red Data Lists* follows IUCN taxonomic guidelines (Strahm 1998); the most recent taxonomic accounts were used (see Table 1), but occasionally additional sources were sought (Lebrun & Stork 1994-1997; *Index Kewensis*). Recently revised synonyms were only rejected in exceptional circumstances and upon request in situations where updated names are not currently being used in leading botanical institutions. However,

in such instances, this deviation was stated and one or more synonyms provided. This nomenclatural approach fosters a greater understanding and appreciation of RDLs in countries that may only become aware of name changes at a later stage. Author citations follow Brummit & Powell (1992); for authors not in the list, initials and full surnames were used. Further taxonomic problems similar to those detailed by Hilton-Taylor (1996a) were encountered and are not repeated here.

Threatening Processes

Nineteen categories of threat were used for the RDL assessments (Table 2); these threats are the deleterious causal factors for species decline in southern Africa. The full extent and synergisms (cascading ecological effects) of threatening processes on plant species in southern Africa can be understood only with further scientific analyses and could well form the basis of future policy-based work aimed at alleviating these threatening processes.

Results

The RDLs included in the *Southern African Plant Red Data Lists* book show that about 3,900 taxa are nationally threatened or potentially threat-

ened with extinction in southern Africa. Some 1,962 of these taxa are endemic—occurring only in a single country—and 33 are recorded as being extinct (Table 3).

There are, in addition, notable differences in the *Southern African Plant Red Data Lists* compared to the following publications:

- Walter & Gillett (1998)—species categorised as globally *Rare*, *Endangered*, *Vulnerable*, and *Indeterminate* according to a now outdated RDL system outlined in Davis *et al.* (1986)
- Oldfield *et al.* (1998)—globally listed tree species according to the IUCN (1994) RDL system
- Hilton-Taylor (2000a)—globally listed (mainly threatened) tree taxa according to the IUCN (1994) RDL system

Although it is inherently problematic to compare the total number of species listed in this publication with previous publications owing to the different RDL systems that were used and different RDL categories that were presented, it nevertheless yields interesting comparisons (Table 4).



IUCN Red List system of categories and criteria. Left: IUCN (1994) Right: IUCN (2001).

For example, the number of endemic species, the number of poorly known taxa (poorly represented in herbarium collections), and the number of newly discovered species listed in the *Southern African Plant Red Data Lists* are all higher than the numbers in the publications mentioned above.

Moreover, many problems were experienced during the compilation of the RDL, especially in Angola and Mozambique. More than 25 years of civil war in Angola have made botanical work there acutely cumbersome. Existing botanical information for Angola is scant and outdated, and provides little useful information for RDL initiatives. This is evident even in previous RDLs; for ex-



Plant RDLs from left to right: Hilton-Taylor (1996a), Walter & Gillett (1998), Oldfield *et al.* (1998) and Hilton-Taylor (2000a).

ample, out of a list of 32 taxa for Angola, 26 represented the genus *Euphorbia* and more than 65% of these were categorised as *Indeterminate* (Walter & Gillett 1998). Previous RDLs for Angola (Oldfield *et al.* 1998, Walter & Gillett 1998) have been presented as no new information was available.

Mozambique, which has also been ravaged by many years of civil war, still has many lacunae of information, as indicated by the high number of species categorised as *Data Deficient* (many range restricted species and country endemics). High proportions of *Data Deficient* species in southern African countries can be generally attributed to poor taxonomy and too low a resolution of field knowledge. Proactive steps should be sought to resolve these impediments.

Likewise, the RDL for South Africa is preliminary and part of a continuing process. Hilton-Taylor (1996a) listed 3,268 species for South Africa and the sheer volume of work could not be accommodated within the time constraints of the *Southern African Plant Red Data Lists*. We advise that Hilton-Taylor (1996a,b, 1997) be used in conjunction with this work until such time that the South African RDL is complete.

National versus Global Red Data Lists

There are various 'for and against' debates for the appropriate geopolitical scale of RDL assessments, but this decision ultimately rests with the country in question. A country-by-country (national) scale was selected as the most effective option for the southern African region.

National assessments capture the local essence (intensity and extent) of threats to species at a greater resolution compared to global assessments. The impact of threats on resident populations may be diluted in global accounts, no matter how destructive these threats may be on national populations. In addition, national assessments provide a more effective vantage point for advocacy and lobbying using national policy and legal instruments. National assessments also promote greater flexibility and participation because countries are able to establish their own conservation agendas in terms of the kinds of species that are represented on RDLs.

On the other hand, global assessments allow for charismatic flagship species to be raised to a higher international profile and hence global-scale work is more attractive



***Astridia citrina* was previously listed as *Rare* by Hilton-Taylor (1996a). (Photo: NBI)**

for funding options and conservation action. Global-scale assessments also provide an opportunity for developing countries to shoulder responsibility and collaborate at the global level. Conversely, these assessments provide the unfortunate possibility of 'passing the buck', that is, to delegate responsibility to countries that, in turn, may not take on responsibilities for conserving RDL species. These issues need to be taken into consideration when RDLs are compiled, because national, regional, and global agendas including social, economic, and political agendas are inevitably reflected in the content of RDLs.

Hilton-Taylor (1996a) warns that a shortcoming of sub-national scale RDLs is that there is a tendency to place emphasis on only certain families or genera. Parochial approaches may lead to an uneven distribution of already limited resources and also result in other, more important, species being overlooked. National, regional, and global RDLs should reflect synergistic attempts for the conservation of threatened species.

Conclusions

Over the years, better sources of information have become available and technologies have advanced for more efficient con-



***Moraea aristata* is known from a few plants on the Cape Flats, a high-density urban area in the Western Cape Province. (Photo: NBI)**

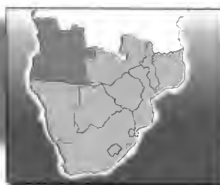
solidation and processing of data. Now, more poorly known species, those known only from type collections or from type localities, utilised species, range-restricted species, and endemics have all been included on the *Southern African Plant Red Data Lists*. The inclusion of species known only from single herbarium collections or known only from type localities provides a platform for taxonomic efforts to resolve information on imperfectly known taxa.

The IUCN/SSC—the proponents of RDLs—recommends that RDL compilers work more closely with designated IUCN authorities who will not only endorse *bona fide* RDL compilations, but are also in a position to provide the most up-to-date information (see Hilton-Taylor 2000b). RDL publications that go unchecked may cause confusion regarding the conservation status of species; this creates uncertainty and may pose a setback in instances where conservation action is urgently required. For this reason, any suggested changes (including additions and de-listings) to the *Southern African Plant Red Data Lists* should be logged and integrated into future RDL updates. To date, the compilation of plant RDLs for southern Africa has been intermittent and not part of a continuous process. If serious efforts are to be made to minimise species losses in the southern African region, communication within and between countries on suggested changes to RDLs needs to take place.

Early-warning systems to monitor the status and trends of biodiversity loss play a pivotal role in minimising and preventing species extinctions. An RDL is a sophisticated and universally understood system. The *Southern African Plant Red Data Lists* publication is a technical contribution towards political approaches that are required to retain the region's rich botanical heritage.



***Alberta magna*—the Natal Flamebush tree is used for medicinal purposes, is naturally rare and occurs in low numbers. (Photo: NBI)**



André Dombo,* Esperança da Costa* & Georgina Neto*

Introduction

The loss of biological diversity is an issue that is a concern for many around the world, because human populations depend on natural plant resources for food, medication, fuel, charcoal, timber, and so forth. Many plant populations have been decreasing and important ecosystems are often destroyed, fragmented, and degraded. Owing to modern factors like pollution, climate change, and alien plant invasions, the added human pressure on natural resources results in many ecosystems being readily and irreversibly destabilised.

Angola has a total area of 1,246,700 km² and a coastline of almost 1,650 km in length. Its heterogeneous topography and its equatorial position make Angola one of the richest sub-Saharan countries in terms of floral wealth. Sadly, however, the flora of Angola is poorly understood due to the lack of formal studies of the plant diversity of the country (for example, the Flora volumes of *Conspectus florae angolensis*).

Nevertheless, one of the milestones for Angolan botany was the publication of a

phytogeographic map (*Carta fitogeográfica*) by Gossweiler in 1939. This map was subsequently improved upon by Barbosa (1970). Barbosa used 32 broad vegetation types to describe the floristic diversity of Angola. These vegetation types range from rich tropical forests in the Angolan enclave in the northwest (Cabinda) to the more xeric, unvegetated dunelands in the extreme south (Namibe) (for a summary, see Huntley & Matos 1994). The Angolan flora has affinities with the Zambezian Regional Centre of Endemism, the Guinea–Congolian, Guinea–Congolian/Zambezian, Afromontane, Kalahari Highveld and the Karoo–Namib phytochoria (White 1983). The Zambezian Centre occupies some 80% of the country, particularly the central plateau, which is primarily vegetated by miombo woodlands.

In 1988, Walter & Gillet listed 32 vascular plant species as threatened with extinction. This represents 0.6% of the Angolan flora.

Almost three decades of civil war and military activity have allowed for regeneration in many areas of the Angolan flora. On the other hand, the war has placed pressure on



Landscape of southwestern Angola on the edge of the escarpment, at Tundavala. (Photo: SABONET)

*Herbarium, ex-Centro Nacional de Investigação Científico, Luanda, Angola

Capital: Luanda, largest city and main port

Area: 1,246,700 km²

Languages: Portuguese (official), Kimbundu, Umbundu, Kongo, Chokwe

Currency: Kwanza (KZR)

Total plant species: 5,185

Total plant endemics: 1,260

Total RDL plants: no information available

Focal RDL institutions: LUAI, PRE

Number of Protected Areas: six National Parks, other informal reserves (such as strict, forest, partial, regional, and hunting reserves), and several proposed protected areas.

Population: 12,356,900 **Growth Rate:** 2.9% **Density:** 9.4 people/km²

Phytogeography: Predominantly Zambezian, with longitudinal bands of Kalahari–Highveld and Karoo–Namib in the southwest. Guinea–Congolian pockets interspersed amongst Guinea–Congolian/Zambezian Regional Transition Zone in the northernmost extreme, and Guinea–Congolian in Cabinda. Scattered Afromontane pockets primarily on the interior plateau.

Flora: Mainly miombo woodland (and other variants) and grassland savannas, with patches of lowland rainforest in the north. Intermediate elevation forest on the western escarpment, montane forests in the highlands, and arid desert and sub-desert formations in the southwest.

Sources: Anonymous 2000, Excell & Gonçalves 1973, Huntley & Matos 1994, Stuart & Adams 1990, White 1983

plant resources for charcoal and fuelwood (Huntley & Matos 1994), as well as a source of foreign exchange. The former is especially evident in the vicinities of densely populated areas with limiting infrastructures, whereas the latter takes place in more remote areas (McNeely 1998).

Background

Geomorphology

A relatively narrow strip along the coastline has an altitude of 0–200 m; altitude increases to 1,000 m to 1,500 m and higher in the interior of the country (hill zone). Between 200 m and 1,000 m, the relief of the escarpment is diverse and steep. The largest part of the country lies between 1,000 m and 1,500 m in altitude. The highest point in Angola is Morro do Môco (2,620 m), situated in Huambo Province (central western Angola).

Climate

There are three large climatic zones in Angola:

- *Tropical humid*, where the precipitation is high
- *Tropical dry*, where the precipitation is low
- *Desert*, where precipitation is very rare and the diurnal temperature range is very wide

Two key factors contribute to this climate pattern: the cold Benguela Current and the high-pressure system from the Atlantic south. These cause precipitation to decrease as latitude and altitude increase. For example, the lowest precipitation values are found in the Namibe Desert in southwest Angola which is situated at latitudes near the centres of these high-pressure cells. The Benguela Current accounts for the streams of cold air in the littoral zone of the southern part of the country. The low air temperatures result in high water vapour concentrations which cross the littoral. The

precipitation in the areas closest to the coastline in the south is thus low. The highest values for annual atmospheric precipitation (orographic) are found in the central hills of the country. The coldest zones are between the central plateau and desert region on the coastline. The hottest zones are areas further north and east.

Vegetation

The most comprehensive study of the Angolan vegetation to date is that of Gossweiler & Mendonça (1939), which was later updated by Barbosa (1970). Barbosa described 32 vegetation types, with about 100 vegetation subtype descriptions. Out of a total of 5,185 species, 1,260 are estimated to be endemic to Angola, based on a statistical analysis (Gonçalves & Excell 1973, Bamps 1975).

The northern territories of the country are poorly known compared to the south. In Cabinda, several vegetation types predominate and consist of evergreen forest

Table 1. Threatened species listed by Walter & Gillett (1998); * denotes endemic taxa.

Species	Family	Conservation status
<i>Aloe inamara</i> *	ALOACEAE	Rare (R)
<i>Aloe mendesii</i> *	ALOACEAE	Vulnerable (V)
<i>Amanoa strobilacea</i>	EUPHORBIACEAE	Vulnerable (V)
<i>Ceropegia chipiaensis</i> *	ASCLEPIADACEAE	Rare (R)
<i>Encephalartos laurentianus</i>	ZAMIACEAE	Rare (R)
<i>Euphorbia ambacensis</i> *	EUPHORBIACEAE	Rare (R)
<i>Euphorbia atrocarmesina</i> subsp. <i>atrocarmesiana</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia atrocarmesina</i> subsp. <i>arborea</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia berotica</i> *	EUPHORBIACEAE	Rare (R)
<i>Euphorbia caerulans</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia cannellii</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia congestiflora</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia cuneneana</i> subsp. <i>cuneneana</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia cuneneana</i> subsp. <i>rhizomatosa</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia dekindtii</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia demissa</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia dispersa</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia faucicola</i> *	EUPHORBIACEAE	Rare (R)
<i>Euphorbia imitata</i> *	EUPHORBIACEAE	Rare (R)
<i>Euphorbia indurescens</i> *	EUPHORBIACEAE	Rare (R)
<i>Euphorbia ingenticapsa</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia mwinilungensis</i>	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia nubigena</i> var. <i>nubigena</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia oligoclada</i> *	EUPHORBIACEAE	Rare (R)
<i>Euphorbia opuntiioides</i> *	EUPHORBIACEAE	Rare (R)
<i>Euphorbia scitula</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia semperflorens</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia strangulata</i> subsp. <i>deminuens</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia strangulata</i> subsp. <i>strangulata</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia vallis</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Euphorbia viduiflora</i> *	EUPHORBIACEAE	Indeterminate (I)
<i>Lotononis newtonii</i> *	LEGUMINOSAE: PAPILIONOIDEAE	Rare (R)

physiognomic variations amongst semi-deciduous forest communities. The more important species in Cabinda include *Oxystigma oxyphyllum*, *Terminalia superba*, *Gilletiodendron oogouense*, *Gossweilerodendron balsamiferum*, and *Entandrophragma angolense*. These trees reach heights of over 30 m. These species are also commonly found in northern regions such as Uíge, Bengo, and Cuanza Norte Provinces where species of *Celtis* and *Morus* are widespread.

Savannas cover the largest part of the country and are often described as mosaics of jungles and forests in several vegetation types, particularly in areas near the border with the Democratic Republic of Congo and Zambia. In savannas, as in most open 'forest', tall grasses occur frequently; in mosaic forest/savanna areas (associated with the Guinea–Congolian/Zambezian Phytocoria), species of *Hyparrhenia*, *Andropogon*, *Pennisetum*, and *Panicum* are common. In wooded shrublands, the following species are dominant: *Hymenocardia acida*, *Erythrina abyssinica*, *Piliostigma thonningii*, and *Cussonia angolensis*. In Zaire, Malange, and Lunda Norte Provinces, semi-deciduous closed forests in association with tall grasses are common.

According to Monteiro (1970a, b), herbs

and xerophytes characterise the landscape of Bié. Here, the vegetation typically consists of trees or climbing shrubs, herbs with long, hard leaves and plants with woody rootstocks.

The vegetation of Huíla, Moxico, Lunda, and Malange Provinces is characterised by open forest with *Brachystegia* sp., *Julbernardia paniculata*, *Isobrerlinia angolensis*, *Erythrophileum africanum*, *Burkea africana*, *Swartzia madagascariensis*, *Parinari curatellifolia*, *Monotes* sp., *Uapaca* sp., and *Faurea* sp. in several associations (Monteiro 1970a, b). Barbosa (1970) described the vegetation of this region as miombo woodland, a division called vegetation type Number 16. According to Barbosa (1970), miombo in Angola appears at altitudes of 1,450 m and above. The term 'miombo' is a vernacular name that has become generalised to refer to woodland with an abundance of species of the genera *Brachystegia*, *Julbernardia*, and *Isobrerlinia*. Sometimes, however, these genera are not dominant owing to destruction by practices such as fire-clearing for agricultural purposes. In these situations, miombo is replaced by secondary savanna. Shrublands may then rapidly be transformed into treeless edaphic grasslands. Referring to this phenomenon, Diniz & Aguiar, (1968) in their Classification of Natural Regions of Angola, state that this belongs



***Cyphostemma juttae* is typical of the landscape near the Angola–Namibia border.**

(Photo: P. Burgoyne)

to Region XI where the climate is mainly dry. Here, *Combretum* species form the wooded savanna with associated grasslands composed of *Hyparrhenia* in low-iron clay soils.

An additional vegetation type in Angola is the mangrove community. Mangroves are in high abundance and diversity in Cabinda and Zaire Provinces and decline in both area of occupancy and dominance further south; they reach the end of their distribution range in Benguela Province where they appear in small patches and then totally disappear in the desert areas of the south. The most important mangrove species are *Rhizophora mangale*, *R. racemosa*, *R. harrisonii*, *Avicennia germinans*, and *Laguncularia racemosa*. Also associated with mangrove communities are species of *Sesuvium portulacastrum* and *S. mesembrianthemoides*.

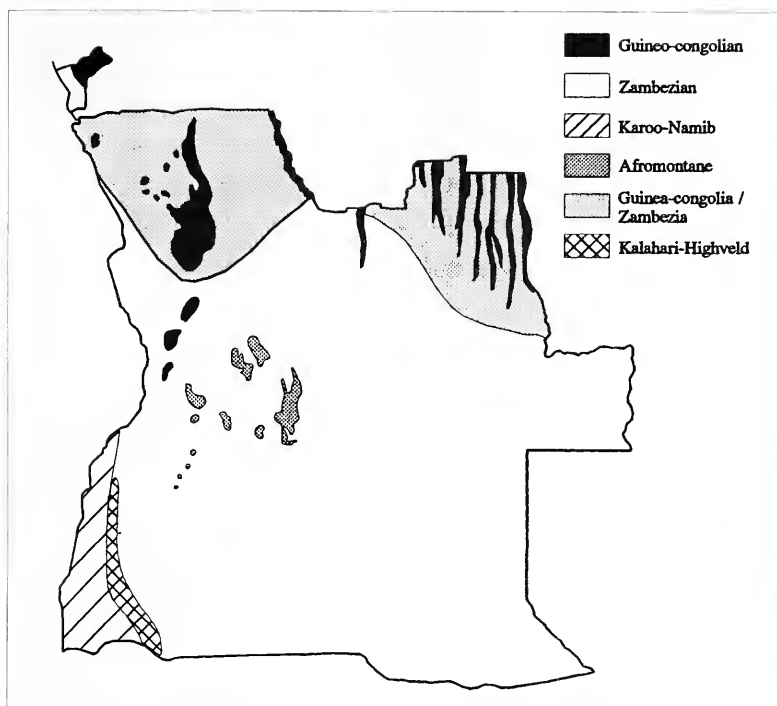
Red Data Lists for Angola

To date, no local publications that document overutilised species and list their actual conservation status have emanated from Angola. Only two Red Data Lists have been compiled for Angola, namely Oldfield *et al.* (1998) and Walter & Gillett (1998). Both are meaningless for decision-makers in Angola as the latter represents mainly the genus *Euphorbia* (Table 1), whereas the other is based on common and widespread tree species. Both these lists are global.

The 1998 list, compiled by the World Conservation Monitoring Centre (Oldfield *et*

Table 2. Threatened tree species listed by Oldfield *et al.* (1998).

Species	Family	Conservation status
<i>Amanoa strobilacea</i>	EUPHORBIACEAE	VU A1cB1B2c
<i>Irvingia gabonensis</i>	IRVINGIACEAE	LR-nt
<i>Azelia bipindensis</i>	LEGUMINOSAE: CAESALPINIOIDEAE	VU B1B2c
<i>Azelia pachyloba</i>	LEGUMINOSAE: CAESALPINIOIDEAE	VU A1cd
<i>Albizia ferruginea</i>	LEGUMINOSAE: MIMOSOIDEAE	VU A1d
<i>Baikiaea plurijuga</i>	LEGUMINOSAE: CAESALPINIOIDEAE	LR-nt
<i>Baphia marceliana</i>	LEGUMINOSAE: PAPILIONOIDEAE	VU D2
<i>Brachystegia bakeriana</i>	LEGUMINOSAE: CAESALPINIOIDEAE	VU B1B2c
<i>Dalbergia melanoxylon</i>	LEGUMINOSAE: PAPILIONOIDEAE	LR-nt
<i>Gossweilerodendron balsamiferum</i>	LEGUMINOSAE: CAESALPINIOIDEAE	EN A1cd
<i>Swartzia fistuloides</i>	LEGUMINOSAE: PAPILIONOIDEAE	EN A1cd
<i>Entandrophragma angolense</i>	MELIACEAE	VU A1cd
<i>Entandrophragma candollei</i>	MELIACEAE	VU A1cd
<i>Entandrophragma cylindricum</i>	MELIACEAE	VU A1cd
<i>Entandrophragma utile</i>	MELIACEAE	VU A1cd
<i>Khaya anthotheca</i>	MELIACEAE	VU A1cd
<i>Khaya ivorensis</i>	MELIACEAE	VU A1cd
<i>Lovoa trichilioides</i>	MELIACEAE	VU A1cd
<i>Turraeanthus africanus</i>	MELIACEAE	VU A1cd
<i>Milicia excelsa</i>	MORACEAE	LR-nt
<i>Prunus africana</i>	ROSACEAE	VU A1cd
<i>Hallea ledermannii</i>	RUBIACEAE	VU A1c
<i>Hallea stipulosa</i>	RUBIACEAE	VU A1cd
<i>Nauclea diderrichii</i>	RUBIACEAE	VU A1cd
<i>Haplocoelopsis africana</i>	SAPINDACEAE	DD



Vegetation map of Angola. (Source: Huntley & Matos 1994)

al. 1998), represents only tree species (Table 2). Most of these are common in miombo woodland or well-known from other countries. From an Angolan viewpoint, none, with the exception of one or two, merit Red Data List status.

Threats to Plant Species in Angola

The following cultural practices have direct effects on the Angolan vegetation:

- Use of firewood and charcoal
- Use of several plant species for medicinal

purposes, traditional local rites, and ornamental purposes

- Trade in timber species
- Use for local construction

According to the International Strategy for Biological Diversity (1994), the following factors account for the degeneration of biological diversity:

Destruction and Fragmentation of the Environment There are few undisturbed ecosystems as a result of increased dependence on vital natural resources. The key

causes for destruction of Angolan tropical forests are the expansion of small-scale subsistence agriculture and the extension of road networks for the timber trade.

Introduction of New Species The introduction of new species with invasive properties, often from other countries, is responsible for the extinction of several species, in particular on island landmasses or in centres of diversity and endemism. Isolated ecosystems are more prone to invasions since aliens have a competitive advantage over indigenous species.

Over-Exploitation of Plant and Animal Species Several forest species have been over-exploited until near-extinction. The collection of food resources has resulted in many important indigenous species dropping to very low numbers.

Much of the habitat degradation in Angola occurs along the coastline near human settlements. These areas are generally isolated from military activities, which are concentrated in the central plateau areas of Angola. Extensive habitat degradation is expected to be taking place in remote small towns and villages in the interior of the country since extreme starvation and malnourishment of people appear to be on the increase in these areas. People are dependent on natural resources as food supplies are often cut due to the war. Despite the war, important tree species are being logged at unprecedented levels, primarily by powerful multinational companies. The impact of logging activities on tree species cannot be estimated in Angola, although *Gossweilerodendron balsamiferum* from the Cabinda area was categorised as EN A1cd (Oldfield *et al.* 1998). In addition, important fuelwood species in towns and small villages are rapidly being depleted.

There is no national information available that can be used in the compilation of Red Data Lists for Angola.



Landscape south of Luanda. (Photo: SABONET)



***Dalbergia melanoxylon* wood carvings are common at market places. (Photo: NBI)**



André Dombo,* Esperança da Costa* & Georgina Neto*

Introdução

A destruição da diversidade biológica é uma das crises que preocupa o mundo. A preocupação sobre o estado dos recursos biológicos do qual depende significativamente a vida humana está aumentando. Muitas espécies diminuem rapidamente a níveis populacionais críticos, habitats importantes são frequentemente destruídos, fragmentados e degradados, e vários

ecossistemas são desestabilizados através da poluição, de mudanças do clima, de espécies invasoras e através da pressão directa que o homem exerce na natureza.

Angola é um País que se situa no hemisfério sul do continente Africano, com uma superfície de 1,246,700 km². A fronteira marítima de Angola é de 1,650 km de costa. As características geográficas e a sua localização, tornam-no um país com uma das

mais ricas diversidade vegetal na África subsahariana, porém, insuficientemente conhecida pois poucos são os estudos efectuados sobre a diversidade botânica do País (por exemplo, *Conspectus Florae angolense*) Da bibliografia existente destaca-se a *Carta fitogeográfica* de Gossweiler (1939), melhorada mais tarde por Barbosa (1970). Segundo Barbosa (1970) cerca de 32 tipos de vegetação, podem ser considerados em Angola, desde as florestas húmi-

Tabela 1. Apesar de até agora não existir publicações locais que retratem o actual estado de conservação da flora nacional, na sua publicação de 1997 (Walter & Gillett 1998), a IUCN apresenta a seguinte lista de plantas ameaçadas em Angola [* = endémico].

Espécie	Família	Estado de conservação
<i>Aloe inamara</i> *	ALOACEAE	Rara (R)
<i>Aloe mendesii</i> *	ALOACEAE	Vulnerável (V)
<i>Amanoa strobilacea</i>	EUPHORBIACEAE	Vulnerável (V)
<i>Ceropegia chipiaensis</i> *	ASCLEPIADACEAE	Rara (R)
<i>Encephalartos laurentianus</i>	ZAMIAEAE	Rara (R)
<i>Euphorbia ambacensis</i> *	EUPHORBIACEAE	Rara (R)
<i>Euphorbia atrocarmesina</i> subsp. <i>atrocarmesiana</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia atrocarmesina</i> subsp. <i>arborea</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia berotica</i> *	EUPHORBIACEAE	Rara (R)
<i>Euphorbia caerulans</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia cannellii</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia congestiflora</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia cuneneana</i> subsp. <i>cuneneana</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia cuneneana</i> subsp. <i>rhizomatosa</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia dekindtii</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia demissa</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia dispersa</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia faucicola</i> *	EUPHORBIACEAE	Rara (R)
<i>Euphorbia imitata</i> *	EUPHORBIACEAE	Rara (R)
<i>Euphorbia indurens</i> *	EUPHORBIACEAE	Rara (R)
<i>Euphorbia ingenticapsa</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia mwinilungensis</i>	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia nubigena</i> var. <i>nubigena</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia oligoclada</i> *	EUPHORBIACEAE	Rara (R)
<i>Euphorbia opuntoides</i> *	EUPHORBIACEAE	Rara (R)
<i>Euphorbia scitula</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia semperflorens</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia strangulata</i> subsp. <i>deminuens</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia strangulata</i> subsp. <i>strangulata</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia vallis</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Euphorbia viduiflora</i> *	EUPHORBIACEAE	Indeterminada (I)
<i>Lotononis newtonii</i> *	LEGUMINOSAE: PAPILIONOIDEAE	Rara (R)

*Herbarium, ex-Centro Nacional de Investigação Científica, Luanda, Angola

das de Cabinda até as zonas semiáridas do Namibe. Entretanto outros autores foram se destacando em obras relevantes como sendo Monteiro (1970a, b) que descreve ao pormenor a vegetação do Bié com relevância na vegetação do tipo Miombo.

Segundo a tipografia de vegetação de White (1983), os seguintes tipos fision/omícos podem ser encontrados Guineo-Congolês, Zambeziaco, Afro-Montanhas, Karoo-Namibe, de Transição Guineo-Congolês/Zambeziaco e a de Transição de Estepes do Kalahari; dentre elas, a do domínio Zambeziaco ocupa cerca de 80% da extensão territorial (Huntley & Matos 1994).

Na lista da IUCN sobre plantas ameaçadas de extinção, Angola é citada como tendo 32 espécies de plantas vasculares ameaçadas (Walter & Gillet 1998), representando este número 0.6% da sua vasta flora que possui cerca de 5,185 espécies diversas. Se por um lado a situação guerra que vem devastando o País há mais de três décadas terá trazido determinados benefícios em relação a regeneração da flora nacional em determinados pontos do País (Huntley & Matos 1994), não é menos verdade afirmar que, terá trazido por outro lado, consequências negativas, particularmente nas áreas pró-

ximas dos grandes centros urbanos onde a concentração da população é maior, e por conseguinte, onde também é maior a procura do combustível (McNeely 1998).

Generalidades do País

Geomorfologia

O País possui uma estreita faixa de planície as altitudes variando de 0–200 m no litoral, elevando-se até aos 1,000 m nas zonas de montanhas, continuando a subir até aos 1,500 m. A faixa dos 200 aos 1,000 m é considerada zona subplanáltica de relevo muito heterogêneo. A faixa dos 1,000–1,500 m ocupa a maior parte do território Nacional e é considerada fundamentalmente zona planáltica de relevo pouco acidentado. Entretanto Angola possui regiões de altitudes superiores a 2,000 m são as designadas zonas de cadeia de montanhas. O ponto mais alto é o Morro do Môco que se situa na província do Huambo e que atinge 2,620 m.

Clima

Em todo País pode ser localizado três grandes zonas climáticas:

- Zona de clima tropical húmido, onde a

estação das chuvas prevalece à seca

- Zona de clima tropical seco, onde a estação seca é maior que a das chuvas
- Zona de clima desértico quente onde a precipitação é muito escassa quase ausente e as amplitudes térmicas diurnas são elevadas

Em Angola há dois factores que condicionam o clima: a corrente fria de Benguela proveniente do Sul eo centro de altas pressões do Atlântico Sul. As precipitações diminuem em geral à medida que aumenta a latitude e a altitude. Os valores mais baixos para a precipitação atmosférica encontram-se no SW de Angola, no deserto de Namibe, onde a latitude e a corrente fria de Benguela se conjugam para provocar grande secura de ar. Tal deve-se a que o deserto do Namibe se situa a uma latitude próxima do Centro de altas pressões tropicais, sendo por isso atingido, durante quase todo o ano, por massas de ar continental e seco vindo desse centro de altas pressões. Entretanto para todo litoral a acção da corrente fria de Benguela faz-se sentir, a qual devido a a sua baixa temperatura não origina grandes concentrações de vapor de água nas massas de ar que a atravessam. Sendo que todo o litoral atingido pela corrente fria de Benguela apresenta também valores pouco elevados para as precipitações atmosféricas anuais.

Os valores máximos de precipitação atmosférica anual verificam-se na zona central da montanha marginal. As regiões mais quentes são áreas de baixa altitude localizadas a leste de Luanda. A região mais fria compreende o planalto central e a zona desértica ao longo da costa.

Vegetação

Um dos grandes estudos de vegetação até hoje conhecido é de Gossweiler & Mendonça (1939) adaptado mais tarde por Barbosa (1970). No seu estudo Barbosa descreve 32 tipos de vegetação (descritos em anexo) considerando ainda vários subtipos. Baseado em análises estatísticas, foi estimado que 1,260 espécies endémicas ocorrem em Angola (Gonçalves & Excell 1973; Bamps 1975). Embora os tipos de vegetação incluam todo País, a parte Norte está mal estudada. Em Cabinda são descritos os tipos que incluem florestas sempre verdes como tipo fisionómico predominante. As espécies mais importantes em Cabinda incluem *Oxystigma oxyphyllum*, *Terminalia superba*, *Gilletiodendron oogouense*, *Gossweilerodendron balsamiferum*, e *Entandrophragma angolense*. Também este

Tabela 2. Esta lista tem representadas somente espécies de árvores (Oldfield et al. 1998), muitas delas conhecidas do Miombo e/ou conhecidas de outros países.

Espécie	Família	Estado de conservação
<i>Amanoa strobilacea</i>	EUPHORBIACEAE	VU A1cB1B2c
<i>Irvingia gabonensis</i>	IRVINGIACEAE	LR-nt
<i>Afzelia bipindensis</i>	LEGUMINOSAE: CAESALPINIOIDEAE	VU B1B2c
<i>Afzelia pachyloba</i>	LEGUMINOSAE: CAESALPINIOIDEAE	VU A1cd
<i>Albizia ferruginea</i>	LEGUMINOSAE: MIMOSIDAE	VU A1d
<i>Baikiaea plurijuga</i>	LEGUMINOSAE: CAESALPINIOIDEAE	LR-nt
<i>Baphia marceliana</i>	LEGUMINOSAE: PAPILIONOIDEAE	VU D2
<i>Brachystegia bakeriana</i>	LEGUMINOSAE: CAESALPINIOIDEAE	VU B1B2c
<i>Dalbergia melanoxylon</i>	LEGUMINOSAE: PAPILIONOIDEAE	LR-nt
<i>Gossweilerodendron balsamiferum</i>	LEGUMINOSAE: CAESALPINIOIDEAE	EN A1cd
<i>Swartzia fistuloides</i>	LEGUMINOSAE: PAPILIONOIDEAE	EN A1cd
<i>Entandrophragma angolense</i>	MELIACEAE	VU A1cd
<i>Entandrophragma candollei</i>	MELIACEAE	VU A1cd
<i>Entandrophragma cylindricum</i>	MELIACEAE	VU A1cd
<i>Entandrophragma utile</i>	MELIACEAE	VU A1cd
<i>Khaya anthotheca</i>	MELIACEAE	VU A1cd
<i>Khaya ivorensis</i>	MELIACEAE	VU A1cd
<i>Lovoa trichilioides</i>	MELIACEAE	VU A1cd
<i>Turraeanthus africanus</i>	MELIACEAE	VU A1cd
<i>Milicia excelsa</i>	MORACEAE	LR-nt
<i>Prunus africana</i>	ROSACEAE	VU A1cd
<i>Hallea ledermannii</i>	RUBIACEAE	VU A1c
<i>Hallea stipulosa</i>	RUBIACEAE	VU A1cd
<i>Nauclea diderrichii</i>	RUBIACEAE	VU A1cd
<i>Haplocoelopsis africana</i>	SAPINDACEAE	DD



***Welwitschia mirabilis*, also found in Namibia, is extremely abundant in the Namibe Province of Angola. (Photo: P. Burgoyne)**

tipo de vegetação é encontrado em regiões da província do Uíge, do Bengo e Cuanza Norte onde espécies de *Celtis* sp. e *Morus* sp.

As savanas cobrem a maior parte do território muitas vezes descritas em vários tipos de vegetação como mozaico com bosques e florestas. Nas savannas é frequente a presença de gramíneas de altura elevada maioritariamente ligada a florestas abertas. Em mosaicos florestas savanna é frequente as gramíneas de baixo porte onde se encontram espécies de vários géneros como: *Hyparrhenia*, *Andropogon*, *Pennisetum* e *Panicum*. Também a estas formações é notória a presença de arbustos lenhosos como *Hymenocardia acida*, *Erythrina abyssinica*, *Piliostigma thonningii* e *Cussonia angolensis*.

Na província do Zaire, Malange e Lunda Norte encontram-se as florestas Serradas Semidecíduas em associação com gramíneas altas. A vegetação da região da Huíla enquadrada no domínio zambesiaco dentro da classificação dos territórios fitogeográficos de Angola. Monteiro (1970a, b), refere que a paisagem desta região caracteriza-se pela dominância de agrupamentos herbosos e xerofíticos em graus diversos, com árvores ou arbustos tropófitos, as ervas cespitosas de pouca altura, com folhas longas e rígidas e plantas com as partes subterrâneas fortemente lenhificadas com a forma de volumosos xilopódios. Dentro das divisões propostas para este domínio, esta região enquadra-se no Sector Huíla-Moxico-Lunda-Malange e é caracterizado por uma floresta aberta (do tipo miombo), de maior porte e com dominância de *Brachystegia* sp.,

Julbernardia paniculata, *Isoberlinia angolensis*, *Erythrophleum africanum*, *Burkea africana*, *Swartzia madagascariensis*, *Pariari curatellifolia*, *Mouotes* sp., *Uapaca* sp., *Faurea* sp., etc. em associações diversas (Monteiro 1970a, b).

Na Carta Fitogeográfica de Angola, Barbosa (1970), caracteriza a vegetação desta região, como sendo do tipo miombo, enquadrando-a no Tipo de Vegetação nº 16 dentro da divisão fitogeográfica por ele feita; e refere-se que, miombo é o nome vernáculo que se tornou mais generalizado na literatura especializada, para designar os bosques (woodland) com abundância de exemplares dos géneros *Brachystegia*, *Julbernardia* e *Isoberlinia*. Segundo este autor, é a cerca de 1,450 m de altitude, que começa este tipo de vegetação, com bosques de *Brachystegia*, *Julbernardia* e *Berlinia* que dominam o miombo. Só não dominam, quando são destruídos pela agricultura itinerante, sendo substituídos por savanas secundárias. Entre estes bosques surgem repetidamente, áreas de savana de natureza edáfica (anharas) não secundárias.

Ao referir-se à vegetação desta região, Diniz, (1973) refere-se que, na observação do esboço por ele realizado, ressalta que, a floresta aberta ou “mata da panda”, com carácter de dominância total na metade N-NE, relacionado com os solos ferralíticos muito espessos e tipos climáticos húmido e sub-húmido, vai gradualmente cedendo lugar a formações mais secas com fácies de mato cerrado de difícil penetração; para o sul do paralelo da Chibia a formação de mato cerrado assume paulatinamente o aspecto fisionómico de balcedo. Na classi-

ficação das Regiões Naturais de Angola (Diniz & Aguiar 1968), está enquadrada na Região IX com uma vegetação predominantemente caracterizada por uma floresta aberta de *Isoberlinia*, *Brachystegia*, *Julbernardia* à qual se associa na orla sul, de clima mais seco, diversos *Combretum* sp, por vezes formações de savana arbustiva com estrato graminoso de *Hyparrhenia*, em solos fracamente ferralíticos argilosos.

Um tipo de vegetação particular são as comunidades de mangal. Em Angola os mangais atingem o seu maior desenvolvimento nas províncias Cabinda, Zaire e vão perdendo progressivamente importância, tanto em área ocupada como em porte das dominantes, até se esbaterem em pequenas formações na província de Benguela e desaparecerem praticamente nas áreas desérticas do Sul. Nestes mangais destacam-se principalmente um estrato arbóreo com zonagem constituído por *Rhizophora mangle*, *R. racemosa*, *R. harrisonii*, *Avicennia germinans* e *Laguncularia racemosa*. Constituindo a orla do mangal encontramos um estrato constituído na sua maioria por *Sesuvium portulacastrum* e *S. mesembryanthemoides*.

Alguns Aspectos Ligados a Legislação Sobre a Conservação da Vegetação em Angola

A legislação sobre a conservação da natureza em Angola foi inicialmente consolidada pela Administração Colonial Portuguesa através do Decreto nº 40.040 (1955), onde vêm estabelecidos os princípios básicos para a Conservação do solo, flora e fauna (Huntley & Matos 1994), inscrevendo-se deste modo no movimento internacional de protecção dos recursos naturais. Este Decreto foi posteriormente complementado pelo Regulamento Florestal, das Províncias de Angola, Moçambique e Guiné (Decreto nº 44531).

O Artigo 31º, O Decreto 40.040 estabelece que, as zonas de protecção podem ser parques nacionais, reservas naturais integrais, reservas parciais e reservas especiais. Ao passo que, o Artigo 2º do Regulamento Florestal (Decreto nº 44531), divide as formações vegetais em naturais e artificiais, compreendendo estas, as matas construídas artificialmente com espécies autóctones ou exóticas e sujeitas normalmente aos métodos da silvicultura intensiva; e aquelas, as florestas naturais e a savanas, em todas as suas gradações e as estepes.

Na legislação em referência, definem-se os seguintes objectivos sobre a protecção da flora:

- Assegurar a manutenção de biótipos aos quais está ligada a sobrevivência de espécies animais e vegetais
- Manter as condições necessárias a existência de biótipos primitivos não alterados
- Manter povoamentos representativos dos tipos fundamentais dos diversos domínios florísticos
- Evitar a destruição de maciços florestais considerados de interesse público ou científico

No Artigo nº 41º do Decreto 40.040, recomenda-se que diplomas especiais regularão o aproveitamento de espécies vegetais espontâneas para fins utilitários, quando haja perigo de depredação ou extinção delas, e bem assim providenciarão quanto ao fomento que se torne necessário. Conclui recomendando que as concessões de terrenos para fins agrícolas, pastorais ou florestais deverão atender à função económica da floresta e do revestimento vegetal, observando os seguintes princípios:

- Protecção e conservação da flora espontânea ou cultivada e seu metódico aproveitamento, de forma a aumentar a sua produtividade
- Criação de novos recursos florestais
- Reconstituição da floresta em áreas antes arborizadas
- Derrube mínimo de árvores na ocupação de terrenos para qualquer fim
- Protecção dos cursos e nascentes de água
- Fixação de dunas e defesa de invasão de areias

Na actual era (pós-independência), Angola possui como áreas protegidas as que figuram no mapa 1. Em termos de legisla-

ção apesar de ainda estar em vigência, tem vindo a ser adequada de acordo com a actual realidade do País. Através da Lei de Bases do Ambiente de 1999, o Estado Angolano privilegia a definição de políticas ambientais que correspondam à uma nova consciência global, com o objectivo não só de renovar ou utilizar correctamente os recursos naturais disponíveis, garantindo assim o desenvolvimento sustentado de toda a humanidade, como também assegurar, permanentemente, a qualidade da vida dos cidadãos. Esta lei tornou-se assim, num instrumento jurídico básico que serve de suporte válido para o surgimento de instrumentos específicos que regularão a protecção das espécies vivas no País.

Listas de Plantas Ameaçadas em Angola

Somente duas listas vermelhas foram compiladas para Angola, Oldfield *et al.* (1998) e Walter & Gillett (1998). Ambas são pouco significativas para os decisores angolanos pois nelas apenas estão listadas Euphorbias. Ambas listas são globais.

Principais Causas de Ameaça das Plantas em Angola

Os hábitos sócio- culturais com influência directa na vegetação da região estudada são:

- Uso da lenha e do carvão como combustível
- A exploração de várias espécies vegetais para fins medicinais, ritos tradicionais locais e ornamentação
- Corte de árvores para aproveitamento da madeira e
- Construção de casas e cabana

Na publicação sobre a Estratégia Mundial da Biodiversidade (UICN 1994), estão identificados os seguintes factores que po-

dem provocar a destruição da biodiversidade:

Destruição e Fragmentação dos Meios

A superfície dos ecossistemas relativamente não perturbados diminuiu de forma espectacular no decurso das últimas décadas com o aumento da população humana e do consumo de recursos naturais. Com efeito, uma das causas da destruição das florestas tropicais é a expansão da agricultura de subsistência e em muitas regiões a comercialização da madeira.

Introdução de Espécies Novas

As espécies introduzidas são responsáveis de extinções de várias espécies, em particular nas ilhas. Nos ecossistemas isolados, um novo predador ou competidor pode rapidamente pôr em perigo espécies que não tenham co-evoluído com espécie introduzida.

Exploração Exagerada de Espécies Animais e Vegetais

Vários recursos florestais vêm sendo explorados exageradamente até a sua extinção. A colheita dos recursos alimentares pelo homem é responsável de várias extinções.

A maior parte da degradação dos habitats ocorre ao longo da zona costeira a qual é um espaço seguro devido a situação de guerra em que o País vive. Esta degradação ocorre maioritariamente nas áreas centrais do País (nas planícies). Espera-se que a maior parte da degradação dos habitats aconteça em pequenas cidades e vilas no interior do País. A população está dependente dos recursos naturais porque as reservas alimentares diminuíram devido a guerra. O abate de espécies de árvores é feito em primeiro lugar pelas grandes companhias internacionais. O impacto deste abate não pode ser razoavelmente estimado, embora a espécie *Gossweilerodendron balsamiferum* da área de Cabinda tenha sido categorizada como EN A1cd (Oldfield *et al.* 1998). Espécies lenhosas importantes nas pequenas cidades e vilas estão desaparecendo rapidamente mas devido ao facto de não existir informação nacional não é possível compilar uma lista vermelha para as referidas espécies.



Flood plain along the Kwanza River. (Photo: SABONET)



Moffat P. Setshogo* & Bruce Hargreaves†

Capital: Gaborone, largest city.

Area: 581,730 km²

Languages: English, Tswana (both official)

Currency: Pula (P)

Total plant species: 2,151

Total plant endemics: 15

Total RDL plants: 43

Focal RDL institutions: UCBG, PRE

Number of Protected Areas: three National Parks, one Transfrontier Park (Botswana-Namibia-South Africa), several Game Reserves and other formally protected areas

Population: 15,881,220

Growth Rate: 1.7% **Density:** 2.7 people/km²

Phytogeography: Zambezan in the north and east, and Kalahari-Highveld in the remainder of the country.

Flora: Open wooded grassland and deciduous bushland in the south-west on Kalahari sands. Zambezan woodland in the north and east, with extensive wetlands in the Okavango Delta and halophytic flora in the Makgadigadi Pan.

Sources: Anonymous 2000, Stuart & Adams 1990

Introduction

The first attempt at compiling an RDL for Botswana was that by Hall *et al.* (1980) in the *Red Data List of southern African plants*. This list was subsequently updated by Hilton-Taylor (1996a) for vascular plants of the *Flora of southern Africa* (FSA) region. The late Peter Smith (of PSUB) started on an RDL for Botswana; his draft was consulted extensively during the compilation of this list. The present study therefore builds on these lists using 1994 IUCN RDL categories (IUCN 1994).

To date, no national checklist has, however, been compiled for the estimated 2,800 plant species of Botswana. Barnes & Turton (1986) and Arnold & De Wet (1993) represent attempts at compiling national checklists, but these authors consider only herbarium specimens of holdings in Botswana and Pretoria (South Africa), respectively. Similarly, there have been no vegetation studies done in recent times. Vegetation maps generally date as far back as the late 1960s and early 1970s (Wild & Fernandes 1968, Weare & Yalala 1971). Very little ecological research has been done on the plants of Botswana; studies have tended to concentrate on plants of unique ecosystems such as the Okavango Delta and the sand dunes of southern Botswana. This lack of sufficient background material has made compiling the national Red Data List a difficult undertaking.

Methods

Various information sources were used for compiling the RDL for Botswana. The process began with consultative meetings held with various stakeholders and individuals in Botswana in early 2000. Information was also sourced from PRECIS. During a final workshop held in September 2001 all the information was consolidated.

The study looked at the RDL status of plants within the political boundaries of Botswana. Comparisons were made with the status in neighbouring countries if the plant species was known to occur in these countries.

Results and Discussion

Number of Species on the RDL

A summary of the general status of species on the RDL is given in Table 1. A total of 43 species appears on the RDL; this represents a small proportion of the flora of Botswana. The majority of the species are *Data Deficient*.

The low number of species represented on the RDL for Botswana can be explained as follows. The Botswana landscape is homogeneous with a fairly undiversified flora. The topography is relatively flat and uniform, with gentle undulations and occasional

Table 1. Status of RDL species.

RDL status	Number of taxa
Critically Endangered (CR)	0
Endangered (EN)	3
Vulnerable (VU)	10
Lower-Risk near threatened (LR-nt)	4
Lower-Risk least concern (LR-lc)	4
Data Deficient (DD)	22
Total	43

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Table 2. Endemism in Botswana.

Endemism	Number of taxa
Confirmed endemic	6
Suspected endemic	9
TOTAL	15

rocky outcrops, mostly along the eastern hardveld. These habitats provide no special refuges for a high diversity of plant species. Species tend to be widespread throughout the country and well-represented in the flora of adjacent countries. Another plausible reason may be that the flora of Botswana is understudied, resulting in very few species on the RDL. Similarly, Hilton-Taylor (1996a) listed only 16 species on the RDL for Botswana (excluding the *Not Threatened* and *Indeterminate/Uncertain* categories).

The number of *Data Deficient* species on this RDL also shows that sufficient information is lacking for many Botswanan plants. These species are mainly known from their type localities and from herbarium collections. There is therefore a need to do more fieldwork on these species (more collections in herbarium cupboards and *in situ* monitoring) and to undertake intensive taxonomic and ecological studies in the country. Some species are known only from records in herbaria of other countries (such as PRE) or from computerised collections (PRECIS). There needs to be an exchange and sharing of information between Botswana and other countries in the region, especially with Namibia (WIND) and South Africa (PRE).

In contrast to neighbouring countries, the level of endemism in Botswana is low; only six species are recorded in this study as being strictly confined to Botswana and a further nine are suspected of being endemic to Botswana (Table 2). Endemic species tend to occupy unique habitats peculiar to certain topographies. Their distribution would theoretically be limited to these habitats. As mentioned earlier, the topography and climate in Botswana are somewhat uniform. Known endemics are recorded mostly from southern Botswana. The topography in the south is not markedly different from the north, but what differs substantially from north to south is the rainfall gradient. Mean annual rainfall generally ranges from over 650 mm in the extreme north to less than 250 mm in the south (Government of Botswana 1998). This suggests that rainfall may be a key environmental variable for the distribution of species in Botswana. There are no near-

endemics (known from an adjacent area of a neighbouring country) recorded for Botswana.

Nature of Species on the RDL

The RDL contains only a few tree species, namely *Acacia hebeclada* subsp. *chobiensis*, *A. hebeclada* subsp. *tristis*, and *Erythrophysa trausvaalensis*. Most plants on the RDL are herbaceous, with the families Orchidaceae, Apocynaceae, and Asclepiadaceae particularly well-represented. A number of reasons could be advanced for this distribution, the most important of which is human bias and the fact that there is so much more information about these groups. Furthermore, these families, especially the orchids, have well-known charismatic species. Most trees in Botswana are common, with a wide distribution both within and outside the country. There are legally protected tree species that occur on state-owned forest reserves; these include *Pterocarpus angolensis*, *Baikiaea plurijuga*, *Azelia quauzensis*, and *Guibourtia coleosperma*. These trees, though included in the *World list of threatened trees* (Oldfield *et al.* 1998), do not appear on the national RDL because they are currently not a problem and, at this stage, are viewed as inappropriate for a national threatened list. In the future, however, these species may become candidates for a national RDL.

On the other hand, more medicinal plants were expected to occur on the RDL. However, little information is available for medicinal plants, except for *Harpagophytum* species. Even for these highly exploited species, there are no reliable data for the entire populations of the species in the country (for example, rates of exploitation and rate of recruitment), because most studies are site-specific. There is a high likelihood that more species are being unsustainably exploited, particularly during this time when many people turn to traditional healers who claim to have cures for HIV/AIDS. It is also difficult to obtain information from traditional healers about the plants they use in their practices.

Conclusions

The main threat to the plants of Botswana is livestock grazing. Most of the rangelands are used for communal grazing. There is also the impact of elephants in the forest reserves. As far as human-induced impacts are concerned, these are still low. There is, nevertheless, a future potential due to the expansion of built-up areas.

The effect of invasive species is not yet a major problem in Botswana. There are currently two species that are potential invaders: the grass *Cenchrus biflorus* and the legume *Prosopis glandulosa*. *C. biflorus* affects yield production in pasturelands. *P. glandulosa* occupies most of the dry riverbeds of the Molopo River and is slowly spreading in the Matsheng villages in the northern Kgalagadi District.

More work needs to be done on the *Data Deficient* species on the RDL. A national checklist, which includes distributions of the species in the country, is currently being compiled. This checklist will be of significant use in future RDL compilations.

Much information about the flora of Botswana is scattered in major herbaria in the region and overseas. Exchange of information and collaborative research with herbaria such as K, PRE, SRGH, and WIND would lead to more publications about the plants of Botswana.

Overall, Botswana is fortunate that its flora is still intact. There is little pressure on its natural resources. This therefore provides time to devise appropriate means for minimising threats to biodiversity.

Acknowledgements We wish to acknowledge the late Mr Peter Smith for his contribution towards this national RDL. The following people are thanked for useful discussions: Mrs Queen Turner, Dr Lilian Turton and Dr David Parry. The list was compiled by Janice Golding.



***Hyphaene petersiana*, a common palm in the Okavango Delta. (Photo: M.P. Setshogo)**

EXTINCT & THREATENED

APOCYNACEAE

Adenium boehmianum Schinz

Status: EN D

Very distinctive-looking plant. Apparently known from only a single Botswana field observation in the hills of Kuke Ghanzi; no herbarium records for this species. Known only from a few individuals. There are varying reports that the species in Botswana may possibly represent a new taxonomic entity. It is known mainly from Namibia where herbarium records exist for it.

Adenium oleifolium Stapf

Status: VU B1B2ce

Threats: Harvesting, collection

Sought after by collectors and used as a medicinal plant. Ointment made from the plant is used for snake and scorpion bites, and a root extract is used for tannic and treating fevers. Rare and definitely requires protection. Is also found in the San Kalahari and Namibia. It has a massive turnip-shaped tuber with a tuft of aerial succulent stems and leaves. Spectacular tubular pink flowers.

ASCLEPIADACEAE

Hoodia lugardi N.E.Br.

Status: VU A1de

Threats: Harvesting, collection

This species has been subsumed as *H. curraii*, but this name is not in use in Botswana. In Botswana, the distribution of this taxon is an east-west belt spanning 600 km. Found in the Kgalagadi Game Reserve. Several localities have been lost due to diamond mining. This plant also has ethnomedicinal value, and has been the subject of intense bioprospecting for the commercial market. Several localities have been extirpated due to the activity of a snout beetle pest. Found in South Africa, Zimbabwe, and elsewhere.

Huernia levyi Oberm.

Status: VU D2

Found in Zimbabwe, Zambia and Namibia (from Mpilila Island in Coprivi). This species is restricted to the Zombezi River drainage area and is uncommon in Botswana. The species has a narrow distribution range and straddles the borders of the four countries in which it occurs. The species was collected in Botswana (Mpondomotengo), but recent surveys have not been able to relocate it there. The species grows at the base of *Acacia*; found in gravelly soil.

Orbea tapscottii (I.Verd.) L.C.Leach

Status: EN A1ac

Threats: Grazing, desiccation, urban expansion

Also known from South Africa. In Botswana, collected in Pitsoane Pan, but a recent survey failed to find it there again; the area has been heavily overgrazed. Other known localities of this species (near Gaborone and Molepolole) have been decimated due to the impacts of donkeys and goats, as well as expanding urban centres. Often associated with *Acacia hebeclada* subsp. *chabiensis*.

Orbeopsis knobelii (E.Phillips) L.C.Leach

Caralluma kalaharica Nel

Status: VU D1D2

Threats: Harvesting

First described in Molepolole. This species is uncommon and difficult to locate in the wild. The subpopulations are very small and disjunct in Botswana. Found on Kolohori sands. Also known from South Africa, Namibia, and elsewhere. Although widespread, it is always rare. It is eaten by people and animals. Has whitish to greenish flowers with purple patches. The whole plant is eaten raw or roasted. Locally it is called 'dodabo'. It has a smoky flavour and is a good source of water.

EUPHORBIACEAE

Euphorbia venterii L.C.Leach ex R.Archer & S.Carter

Status: EN C2a

Endemism: Endemic?

Threats: Urban expansion

Only two subpopulations recorded in Botswana from a gypsum substrate. These subpopulations are extremely disjunct (one in the north, the other in the south) and occur close to the border of eastern Botswana. The possibility exists that this species occurs in Zimbabwe (Plumtree) but this cannot be established without field work and taxonomic validation.

LYTHRACEAE

Nesaea minima Immelman

Status: VU D2

Endemism: Endemic

Known only from the moist grassy area of the Zwezwe Flats floodplain in Botswana.

ORCHIDACEAE

Ansellia africana Lindl.

Status: VU A1ad

Threats: Collection

This is the only epiphytic orchid in Botswana. All orchids are rare in Botswana and therefore, are usually collector's items amongst ecotourists. Frequently observed in cultivation. Wide distribution throughout Africa, but certainly threatened in Botswana. Rumoured to have aphrodisiac properties.

Eulophia angolensis (Rchb.f.) Summerh.

Status: VU A1ad

Threats: Collection

Large, showy orchid that grows in peaty ground in perennial and seasonal swamp. In possible danger due to collectors. Flowers from late October to December. Widespread in Angola, Zambia, Tanzania, Uganda and so forth.

Eulophia latilabris Summerh.

Status: VU A1ad

Threats: Collection

Large, showy orchid that grows in peaty ground in perennial and seasonal swamps. In danger due to collectors. Flowers from late October to December. Widespread in West Tropical Africa.

PORTULACACEAE

Anacampseros rhodesiaca N.E.Br.

Status: VU A1ad

Threats: Harvesting

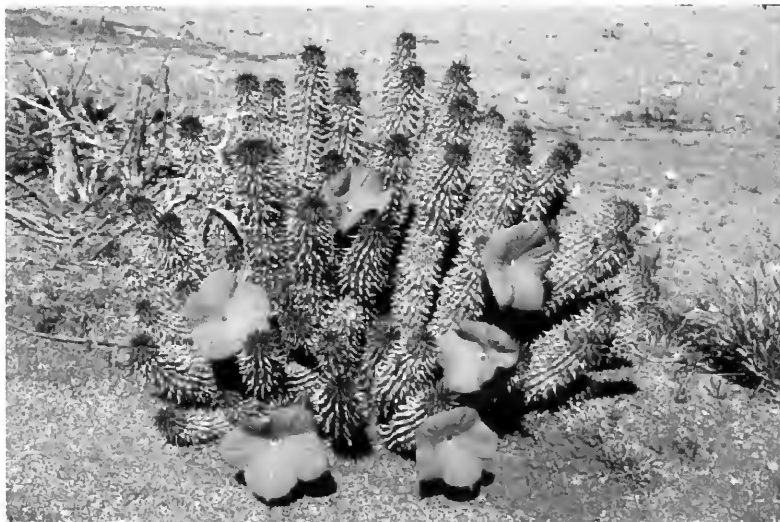
Uncertain in Botswana as this species is at the end of its western distribution range. It is found close to the border near Francistown, and then extends easterly into Zimbabwe. Has a cryptic, rare habitat in Botswana; known from accessible crevices in bare rocky outcrops. It has also been collected in Tantalane (Tati). It has short branches covered with tiny scale-like leaves arising from the tuber. The genus *Anacampseros* has been split into three genera, and the genus *Avania* is the relevant name for this taxon. However, this name is not in use in Botswana. In Zimbabwe, it is known as 'quiliqa' or 'tirika'. Prohibitions were introduced to prevent the use of this species for beer-making.

SAPINDACEAE

Erythrophysa transvaalensis I.Verd.

Status: VU D1D2

The first and only record for Botswana was collected in Shashong in 1993. Known from the former western Transvaal (South Africa) where it is considered rare. Also known from Zimbabwe (possibly Matopos). The habitat of this species is rocky wooded hills, of which there are few in Botswana.



Hoodia sp. from the Kalahari sands of southern Botswana.
(Photo: NBI)

LOWER RISK

ACANTHACEAE

Barleria matopensis S.Moore

Status: LR-lc

No herbarium record of it being collected in Botswana, and also not in PRECIS. However, observed in the wild in Botswana. The distribution of this species in Botswana represents a small proportion of the global population. Known mainly from an area between Francistown and Ramakgwebana. Probably first collected in Matopos in Zimbabwe. Also known from the former Transvaal (South Africa).

Blepharis bainesii S.Moore ex C.B.Clarke

Status: LR-lc

Known from gypsum substrate in southeastern Botswana. Reported to have been observed several times in the vicinity of Matlautsi(e). Also known from southwestern Zimbabwe. However, not found in the former Transvaal area of South Africa. Possibly no herbarium specimens for Botswana. Limited global distribution.

CAPPARACEAE

Boscia foetida Schinz subsp. *minima* Toelken

Status: LR-nt

Threats: Grazing

The varietal status of this species represents plants shorter than 30 cm that are cushion-like. It is suspected that this dwarf form could be a growth form as a result of overgrazing. It may be rare, but it is certainly not threatened in Botswana. It is a shrub found on limestone outcrops, often near ponds or on clay soils. Also found in South Africa (Northern Cape and former Transvaal). Apparently not recorded in Namibia.

CYPERACEAE

Pycnus okavangensis Podlech

Status: LR-lc

Undescribed, small plant. Widespread in north-west Botswana occurring throughout the lower delta, on the Chobe River and near a pan in the Kalahari. Also recorded in Namibia and possibly Angola and Zambia. The species has a wide distribution range.

EUPHORBIACEAE

Jatropha botswanica Radcl.-Sm.

Status: LR-lc

Endemism: Endemic

According to PRECIS, known only from Botswana. This species is fairly well protected since it occurs on black clay which is unsuitable and generally avoided by developments or human settlements. Currently known only from two localities, and this is probably due to collecting efforts.

FABACEAE

Acacia hebeclada DC subsp. *chobiensis* (O.B.Mill.) A.Schreib.

Status: LR-nt

Multi-stemmed tree-shrub. Found in riverbanks or sandbanks close to the northern border of Botswana but only for a limited distance downstream. The species is safe where it occurs, but its numbers and the size of its habitats are exceedingly small when compared to other plants from Botswana. It occupies a niche on an unstable landscape (riverbanks/sandbanks). It is very sensitive to unnatural water level fluctuations. Found in Angola, Namibia and Zambia.

PEDALIACEAE

Harpagophytum procumbens (Burch.) DC. ex Meisn.

Status: LR-nt

No subspecies or varieties of this species is in use in Botswana. High-value export product for its medicinal properties. More valued than *H. zeyheri* since the active ingredient is more concentrated. Could become threatened due to reckless harvesting which is already reported to be taking place (the main tuber is removed rather than the side tubers). However, high levels of recruitment. Found mainly on the Kalahari sands of western Botswana.

Harpagophytum zeyheri Decne.

Status: LR-nt

No subspecies or varieties of this species is in use in Botswana. High-value export product for its medicinal properties. Far more accessible than *H. procumbens* since it is fairly common along the roadsides of eastern Botswana. High levels of recruitment.



Acacia hebeclada subsp. *chobiensis* in habitat in the Okavango Delta. (Photo: M.P. Setshogo)

DATA DEFICIENT

AIZOACEAE

Nananthus aloides (Haw.) Schwantes

Status: DD

Endemism: Endemic?

Known from border area of the Nossob River. The herbarium descriptions of the distribution of this species are unclear, and therefore it cannot be confirmed if the species also occurs in Namibia and South Africa.

Nananthus margaritifera L.Bolus

Status: DD

No herbarium records exist for this species in Botswana. Also known from Namibia where it is legally protected.

ASCLEPIADACEAE

Ceropegia floribunda N.E.Br.

Status: DD

Endemism: Endemic?

According to PRECIS, endemic to Botswana. The type locality is Khwebe Hills. Suspected to also occur in Namibia but this has not been confirmed. May possibly occur in South Africa, but again, this cannot be confirmed. Taxonomically, this species is poorly known.

ASTERACEAE

Arctotis rogersii S.Moore

Status: DD

Could be endemic to Botswana, but may be a synonym or may occur further north. Reported that this may be a garden hybrid which occurs in the Cape (South Africa) but this cannot be confirmed. The taxonomic status of this species is uncertain.

Arctotis serpens S.Moore

Status: DD

Could be endemic to Botswana, but may be a synonym or may occur further north. Reported that this may be a garden hybrid which occurs in the Cape (South Africa) but this cannot be confirmed. The taxonomic status of this species is uncertain.

Erlangea remifolia Wild & G.V.Pope

Status: DD

Endemism: Endemic?

According to PRECIS, endemic to Botswana. Based on the number of herbarium collections, is reported to be common. However, this could well be an artefact since the collections could perhaps have been mistakenly identified as *E. misera*, a common species in Botswana.

Rennera laxa (Bremek. & Oberm.) Kallersjö

Status: DD

Endemism: Endemic?

According to PRECIS, known only from Botswana.

CYPERACEAE

Eleocharis cubangensis H.E.Hess

Status: DD

Endemic to the Okovongo River, and currently known only from Namibia and Botswana.

ERIOSPERMACEAE

Eriospermum linearifolium Baker

Status: DD

Endemism: Endemic

Could be endemic to Botswana, but may be a synonym or may occur further north. Recorded from the Okovongo

and Chobe area. Not known from Namibia.

Eriospermum seineri Engl. & K.Krause

Status: DD

Endemism: Endemic

Not recorded in Namibia. Suspected to be endemic to Botswana, but may be a synonym or may occur further north.

FABACEAE

Acacia hebeclada DC. subsp. *tristis* A.Schreib.

Status: DD

Has down-turned pads, and a small proportion of the global population is distributed in Botswana. It is found in the northwestern corner of Botswana. Mostly, it is known from Namibia and a few plants extend into Botswana in the fossil river valleys. This area is extremely well-protected and inaccessible. This area has also been relatively unexplored by botanists.

ORCHIDACEAE

Habenaria pasmithii G.Will.

Status: DD

In Botswana, it is known only from the Okovongo (type locality). Known from a second collection in Mwinilungo (Zambia). Apparently known only from these disjunct localities. Probably a case of being undercollected or misidentifications of other taxa found between these two localities (possibility of a uniform distribution?). In water meadows and slow-flowing water.

Zeuxine africana Rchb.f.

Status: DD

Extremely rare in southern Africa, but widespread across Africa. In Botswana, known only from the Moremi Nature Reserve, as well as other localities in the north of Botswana such as Xobego Lediba. Flowers in July to August.

POACEAE

Aristida wildii Melderis

Status: DD

Endemism: Endemic?

Could be endemic to Botswana, but may be a synonym or may occur further north (unlikely to occur in the Caprivi). Found in areas of Botswana that are generally rocky.

Panicum coloratum L.Mant. var. *makarikariense* Gooss.

Panicum laevifolium Hack. var. *contractum* Pilg.

Panicum coloratum L.Mant. var. *coloratum*

Status: DD

Endemism: Endemic

The variety is regarded by some as being taxonomically

invalid. Localities of this plant beyond Botswana are instances where the species was introduced. In Botswana, it is known from the north (Makorikori Pan) and the southeast (Gobarane). It is used as a pasture grass.

Panicum gilvum Launert

Status: DD

Also known from Namibia and South Africa. In Botswana, it is known from the north in seasonal water pans. Probably undercollected and widespread.

Panicum pilgerianum (Schweick.) Clayton

Psilachlaa pilgeriana (Schweick.) Launert

Status: DD

In Botswana, it is known from the north (Samedupe Bridge) and the southeast (Content Farm). It is also found in Namibia, in seasonally flooded areas, growing in water. Altitude of about 1,050 m. Probably undercollected and widespread.

Sporobolus bechuanicus Gooss.

Status: DD

Endemism: Endemic

According to PRECIS, known from fewer than five collections and occurring only in Botswana. However, reported to be very common in pans of Mokgodigodi and Lepepe. The main centre of distribution is central Botswana.

ROSACEAE

Griellum cuneifolium Schinz

Status: DD

The type is from Lydenburg in South Africa. The species does not occur in Namibia. It has a restricted global distribution.

SANTALACEAE

Thesium dissitum N.E.Br.

Status: DD

Endemism: Endemic?

According to PRECIS, known only from Botswana.

SCROPHULARIACEAE

Jamesbrittenia integerrima (Benth.) Hilliard

Sutera batipina Hiern

Status: DD

Endemism: Endemic?

According to PRECIS, known only from Botswana.

Jamesbrittenia concinna (Hiern.) Hilliard

Sutera concinna Hiern

Status: DD

Endemism: Endemic?

According to PRECIS, known only from Botswana.



Sunset in an aquatic landscape at Chobe.
(Photo: NBI)

Lesotho



Sumitra Talukdar*

Introduction

The Kingdom of Lesotho—a British Territory from 1868 and a Crown Colony from 1884 to 1966—is today a 30,300 km² independent state completely surrounded by the Republic of South Africa. Bordering Lesotho are the South African provinces of the Free State in the north and west, the Eastern Cape in the south, and KwaZulu-Natal in the east. The western quarter of Lesotho is a continuation of the South African highveld at 1,400 to 1,800 m a.s.l.; within Lesotho this area is known as the *Lowlands* or *Mabalane*. To the east of the Lowlands, the land between 1,800 m and the crest of the first range of mountains is known as the *Foothills*. East of the Foothills, the remainder of the country is known as the *Maloti*, and consists of a number of mountain ranges running mainly north to south, with deeply incised valleys. In the far east of Lesotho the Maloti culminates

in a summit plateau, the eastern rim of which is the watershed between the Atlantic and Indian Oceans and is also the international boundary. Very little of the summit plateau falls within South Africa, because almost immediately to the east of the watershed, the Drakensberg escarpment occurs, typically cliffs about 1,000 m in height dropping down to a foothills region in KwaZulu-Natal.

Geology

Geologically, Lesotho consists of a series of layers of sedimentary rocks overlaid at about 1,800 m a.s.l. by basalt layers, originating from lava that welled up through dolerite dykes which criss-cross the sedimentary as well as the lower igneous layers. The basalt reaches a thickness of some 1,500 m, but the original land surface has been dissected by river valleys. These have been rejuvenated as a result of a series of

Capital: Maseru, largest city

Area: 30,355 km²

Languages: English, Sesotho (both official)

Currency: Maloti (M), on a par with South African Rand

Total plant species: 1,591

Total plant endemics: 17

Total RDL plants: 94

Focal RDL institutions: ROML, PRE

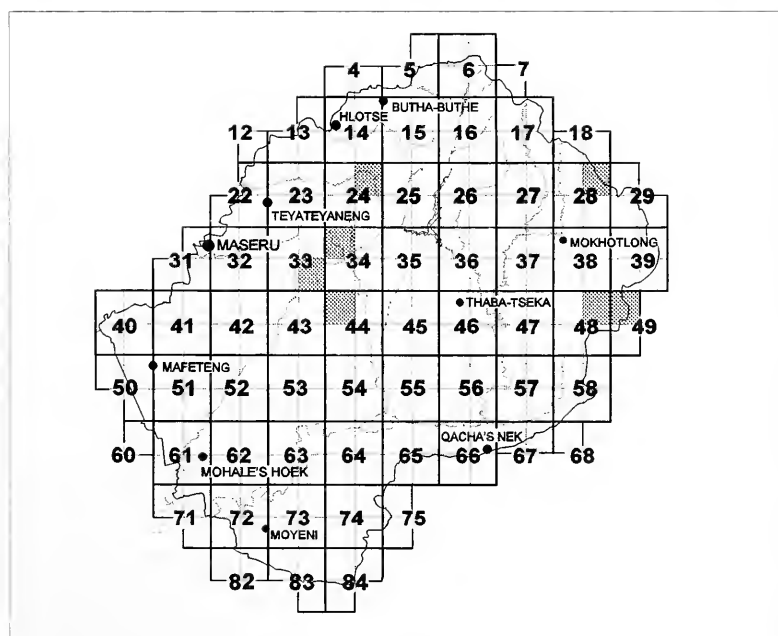
Number of Protected Areas: one National Park, one Transfrontier Park (Lesotho–South Africa) and several different types of informally protected areas.

Population: 2,105,000 **Growth Rate:** 2.3% **Density:** 66.3 people/km²

Phytogeography: Mainly high elevation Afromontane grasslands with Moist Cold Highveld Grasslands in the lower-lying areas of the west.

Flora: Predominantly montane grassland with occasional patches of woodland in ravines and river valleys.

Sources: Anonymous 2000, Low & Rebelo 1998, Mokuku 1999, Talukdar 1994



Map of Lesotho, showing quarter-degree grid squares.

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Aloe polyphylla, a well known high-altitude species. (Photo: J.S. Golding)

uplifts that have left largely horizontal strata in place.

Climate

The climate is generally sunny with an average of 8.8 hours of sunshine a day throughout the year. The seasons are well defined with dry winters and frosts, and temperatures in the Lowlands range from night minima as low as -6°C in winter and day maxima up to 35°C in summer. There is a diurnal range of about 18°C in winter and 15°C in summer. Given that the temperature drops about 1°C per 125 m rise in altitude, the summit plateau can experience temperatures down to -20°C on winter nights, while summer maxima will remain in the range $20\text{--}25^{\circ}\text{C}$.

Rainfall ranges from 600 mm p.a. in the western Lowlands to 1,200 mm in the northern and eastern parts of the summit plateau. In general, there is a marked increase in rainfall as one passes eastwards, except that the Senqu Valley in the central eastern part of Lesotho is in a rain shadow from mountains on both sides and is, in fact, the driest part of Lesotho, with rainfall in places as low as 550 mm p.a. Most rainfall occurs in summer (85% in October to April) as the result of convective storms of relatively short duration, but often associated with downpours and much runoff. More gentle rain from the north-east may last for a few days but occurs only two or three times in a typical summer.

Vegetation Types

There are three main vegetation zones within the overall Grassland Biome which embraces the whole of Lesotho (Ambrose

et al. 2000):

- The *Highveld Grassland Zone* roughly corresponds to the Lowlands
- The *Afroalpine Grassland Zone* corresponds to the summit plateau above 2,500 m altitude, the highest areas within which (rising to a maximum of 3,482 m at Thabana-Ntlenyana) is the only true tundra in southern Africa (Killick 1997)
- Between these zones, the *Afromontane Grassland Zone* corresponds to the remainder of the Maloti and the Foothills.

Though grasses are the most striking features in the vegetation, there are a number of woody plants, trees, and shrubs, and a wealth of herbaceous plants. Within all three zones, are found *Wetlands*, both marshy areas and rivers, which have their own characteristic aquatic flora.

It is the Foothills and Maloti in Lesotho that have plant species uniquely adapted to high altitudes and extreme environmental stresses. The area forms part of the Eastern Mountain or Maloti/Drakensberg “hot-spot” (after Myers 1988, Cowling & Hilton-Taylor 1994) with a high degree of endemism (30%). More than half of this hotspot falls within the boundaries of Lesotho, and a large number of plants that are restricted to the hotspot are commonly known as “Drakensberg endemics,” although they might be more correctly known as “Maloti/Drakensberg endemics” given that the name Drakensberg is only applied to the eastern escarpment within the hotspot area.

Unfortunately, extreme human pressures on the environment in Lesotho through cultivation, grazing, and construction works have become a serious threat to the

specialised indigenous flora. It is therefore important to undertake periodic assessments of the flora to document the changes in its number and composition.

Bryophytes, which have not been evaluated for the *Southern African Plant Red Data Lists*, have sprung many surprises as recorded by Lewinsky & Van Rooy (1990), Hodgetts *et al.* (1999), and Perold (1994, 1998, 1999). Earlier, Magill (1987), who wrote the *Drakensberg of Lesotho* (he meant of course “the Maloti”), said that “it stands out as a biogeographical treasure”.

Lesotho Plant Recording

There are a few rare examples of plants recorded in rock paintings, which may be several hundred years old. For example, Loubser & Zietsman (1994) described a depiction of what is probably *Brunsvigia radulosa* at Thaba-Bosiu in Lesotho.

The first written record seems to have been by Sir Andrew Smith when he described an *Albuca* with yellow flowers and woolly stalks and leaves at Likhoela (“Dequoila”) on 10 October 1834 (Smith 1939). It appears to have been *Albuca shawii* (= *A. tri-chophylla*).

A meticulous collector who also recorded Sesotho names and local plant uses was Anna Dieterlen, wife of Hermann Dieterlen, an Alsatian missionary. While the Dieterlens were stationed at the French Protestant Mission of Leribe (1894–1913), Anna Dieterlen made an almost exhaustive collection of the local flora. Her material provided the essential core of *A contribution to the flora of the Leribe Plateau and environs* (Phillips 1917), the first comprehensive account of the flora of Lesotho. The book lists 329 genera and 749 species; 48 of these species are aliens. Lesotho had previously been regarded phytogeographically as being in a “Kalahari Region,” but Phillips proposed an Eastern Mountain Region to include Lesotho and its immediate surroundings. For this region, he enumerated 91 orders, 466 genera and 1,553 species.

Moreover, Phillips (1917) remarked about the Levi’s Nek Kloof near Leribe, that *Protea caffra* “is rapidly becoming exterminated, as the chief Jonathan now and then has trees cut down for firewood; but fortunately this is a privilege Jonathan alone enjoys, otherwise the species would long ago have disappeared from the neighbourhood”. Given the loss of tree species elsewhere in Lesotho, it might be expected that there

would be little chance that *Protea* would be found in the area today, but Grzegorz Kopij (pers. comm.) reports that it can still be found in the same kloof, albeit in a restricted area.

Both Phillips (1917) and Jacot Guillarmod (1971) give accounts of many people who collected in Lesotho. The *Flora of Lesotho* (Jacot Guillarmod 1971) provides a more recent comprehensive checklist of Lesotho plants and lists 526 genera and 1,537 species of flowering plants. She provides much useful background information and identifies just two Lesotho endemics—the well-known spiral aloe, *Aloe polyphylla*, and the grass *Pentaschistis basitormum*, although in the second case there are now Free State records. She mentions the fern ally *Psilotum nudum* as having a very restricted distribution in Lesotho, and indeed at the present time it is known from only one site (Ambrose *et al.* 2000). Amy Jacot Guillarmod also co-authored the description of the new species *Aponogeton rammenhijlorus* (Jacot Guillarmod & Marais 1972, Jacot Guillarmod 1978), a plant that was first collected by Kate Williamson at Sehlabathebe in Lesotho in 1970; there are now some KwaZulu-Natal records. The plant is now known as the Sehlabathebe water lily and appears on the current Lesotho 15s postage stamp.

Another Lesotho plant collector was Marthe Ruch (later Marthe Schmitz), who came to Roma in 1958 to work in the Botany Department of Pius XII College. She lived in Lesotho until 1982, when she was tragically killed in a car accident. For much of the 24 years that she was in Roma, she was Honorary Curator of the Roma Herbarium, ROML, now housed within the Biology Department of the National University of Lesotho. She collected extensively in Lesotho, being particularly interested in the ecological aspects of plant distribution. Amongst her publications are *Flowering plants of Lesotho: grasses* (1976), which deals mainly with grasses of the Lowlands and Foothills, but includes five high-altitude species. *Wild flowers of Lesotho* was pub-

lished posthumously in 1982, as was *An illustrated key for the identification of the grasses of Lesotho* (1984). This was a more comprehensive account of Lesotho grasses than her 1976 volume, with 17 high-altitude grasses of which three may be considered today as near endemics.

Bruce Hargreaves, Marthe Schmitz's successor as Curator of ROML, joined the National University of Lesotho in 1983 and had a special interest in succulent flora. He discovered the endemic *Crassula goatthambensis* (Hargreaves 1989b) at Tlaeeng Pass at an altitude of over 3,000 m on the eastern summit plateau and later found additional populations at Kotisephola Pass and near Sani Pass. The type specimen is in ROML. He travelled extensively throughout Lesotho and located a number of rare plant species in the Maloti and the Lowlands.

The names of D.J.B. Killick and of O.M. Hilliard and B.L. Burtt are closely linked with the study of high-altitude vascular plants, including those of Lesotho. Killick's account of the plant ecology of the Cathedral Peak area of the Natal Drakensberg (1963) extended to the Afroalpine Grassland of the Tlhanyaku headwaters in Lesotho. His interest in the high-altitude flora led to many visits to the Maloti in Lesotho, and he made collections at Ox-bow, Letseng-la-Terae, Mokhotlong, and Sani Top. His *Field guide to the Flora of the Natal Drakensberg* (1990) is an attractively illustrated account, which includes many species common to both sides of the border, although the gymnosperm species found in KwaZulu-Natal are not found in Lesotho. Dr Killick was particularly punctilious in providing the Roma Herbarium (ROML) with duplicate specimens.

O.M. Hilliard and B.L. Burtt have visited the Maloti several times and their meticulous studies have led to the discovery of several Lesotho endemics, such as *Sintera jurassica* (Hilliard & Burtt 1982) (= *Jamesbrittenia jurassica* (Hilliard 1994)), *S. beverlyana* (Hilliard & Burtt 1986a) (= *J.*

Table 2. Lesotho endemics.

Endemism	Number of taxa
Confirmed endemic	13
Suspected endemic	4
Confirmed near-endemic	30
Suspected near-endemic	7
TOTAL	54

beverlyana (Hilliard 1994)), *Hesperantha crocopsis* (Hilliard & Burtt 1986c), and *J. lesutica* (Hilliard 1994). ROML has also benefited from receiving many duplicate specimens from Olive Hilliard and B.L. Burtt, who have checked the identity of several ROML specimens.

Amongst others who have provided specimens to ROML are E.K. Hoener and Alan C. Beverly, both of whom were based at Sehlabathebe National Park for extended periods at different times in the mid- to late 1970s. Although no specimens reached ROML from the Lesotho Highlands Water Project Phase 1A baseline surveys, duplicates from similar surveys in the Phase 1B area have been placed in ROML. Other sets of accessions to ROML have been received as a result of an expedition to the Maloti undertaken by botanists sponsored by the Lesotho–Durham Link and from a similar expedition sponsored by the Royal Botanic Garden, Edinburgh.

Red Data Lists

Towards the second half of the 20th century, it was becoming apparent that population growth was putting additional pressure on land resources worldwide and that this threatened the very survival of many animal and plant taxa. A Threatened Plants Committee was established in 1974 by the World Conservation Union (IUCN). As a result of this initiative, lists of threatened taxa, known as “Red Data Lists,” were compiled both worldwide and for many geographical areas. The worldwide IUCN volume (Lucas & Syngé 1978) includes the Lesotho endemic *Aloe polyphylla* amongst 250 selected plant species. In southern Africa, the Foundation for Research Development of the South African Council for Scientific and Industrial Research (CSIR) produced Red Data Books for plants and animals, some of which were confined to taxa within South Africa's borders, although the plant volume by Hall *et al.* (1980) provided southern African and not just South African coverage.

Table 1. Number of taxa in each Red List category in Lesotho.

RDL Status	Number of taxa
Extinct (EX)	1
Critically Endangered (CR)	8
Endangered (EN)	4
Vulnerable (VU)	14
Lower-Risk near threatened (LR-nt)	4
Lower-Risk least concern (LR-LC)	3
Data Deficient (DD)	60

A conference on the conservation and utilisation of southern African botanical diversity was convened in Cape Town in September 1993, and the papers and workshop reports were later published (Huntley 1994). The conference recognised the need to produce updated Red Data Books for planning effective conservation policies. Consequently the *Red Data List of southern African plants* (Hilton-Taylor 1996a) was published, it featured the spiral aloe, *Aloe polyphylla*, on its cover.

Methods

The IUCN system for Red Data List categories and criteria was used (IUCN 1994) in the compilation of the RDL for Lesotho.

The term "endemic" is used for plants that occur in Lesotho only and in no other country. The degree of threat has been assessed in the Lesotho context (national). In other areas of southern Africa, the threats to these same species may not be of the same intensity. The publications of Arnold & De Wet (1993), Hilton-Taylor (1996a), and Scott-Shaw (1999) have been useful in placing the locally vulnerable plants in a wider, global context.

Results and Discussion

The Red Data List for Lesotho contains a total of 94 species (Table 1) of which 56 are known to have narrow global distribu-

tions (endemics and near-endemics) (Table 2). One endemic, *Brachystelma alpinum*, is strongly suspected of being extinct. *Agathosma ovata*, classified as *Vulnerable*, is thought to be extinct in Lesotho, although it is well-known in South Africa where its main distribution range is in the Western Cape Province. There are conflicting reports of the abundance of this species in Lesotho. Similarly, *Smodingium argutum* is classified as *Data Deficient*, as it is believed to be extinct in Lesotho, although this could not be confirmed.

Species which may soon become *Critically Endangered* in Lesotho because they are facing a dramatic reduction in population size in the country are *Anisodonteia gracilis*, *Cyathea dregei*, *Ehretia rigida*, *Lotononis listii*, *L. stricta*, *Protea roupelliae*, *P. subvestita*, and *Sparrmannia ricinocarpa*.

Four species that are regarded as being endemic to Lesotho have been categorised as *Vulnerable*, and all are from the Maloti: *Aloe polyphylla*, *Carex killickii*, *Jamesbrittenia beverlyana*, and *J. lesutica*. Three high-altitude near-endemics (also occurring in South Africa) have a restricted global distribution—*Urginea saniensis* is categorised as *Vulnerable*, whereas *Festuca killickii* and *F. dracomontana* were assessed as *Data Deficient*.

Several species—all with restricted distribution ranges—are used in traditional medicine; this has resulted in their becoming vulnerable in Lesotho. The scale of disappearance of medicinal plants in Lesotho has been estimated by Letsie (1993) to be in the order of 100,000 specimens per week, based on an estimated 20,000 diggers taking out five plants each. The species are *Alepidea amatymbica*, *Dicoma anomala* subsp. *cirsioides*, *Encomis autumnalis* subsp. *clavata* (all VU), and *Elephantorrhiza elephantina* and *Scilla natalensis* (both DD). Because the underground parts of the plants are used medicinally, utilisation results in their destruction. The remaining vulnerable taxa found in Lesotho are remnant or limited area populations that are in most cases common elsewhere in southern Africa.

Eight species classified as *Data Deficient* are believed to be Lesotho endemics. In addition, 25 taxa categorised as *Data Deficient* are regarded as near-endemics.

Glumicalyx lesuticus and *Jamesbrittenia jurassica* are both endemics that are fairly widespread and abundant in Lesotho; for

this reason they are categorised as *Lower-risk least concern*.

Conclusions

Throughout this analysis, it has been apparent that the threats to plants are due mainly to human pressure as a result of the extension of settlements and, especially, the pressure by livestock on the fragile ecosystems of the Afroalpine and Afromontane Grassland. The vegetation zones are found in the Maloti on and near the summit plateau adjoining Lesotho's eastern border. Indeed, most endemic and threatened species are to be found within a few kilometres of this eastern border. In the Lowlands and Foothills, areas of much modified Highveld Grassland, severe population pressure has led to such overutilisation of plants for medicinal and domestic purposes that previously viable populations maintain only a precarious existence.

In order to preserve threatened plant populations, a system of locally managed reserves is required. It is essential that in any such developments, those who live among and utilise the plants play a part in their sustainable use and survival.

Acknowledgements Any person compiling a Red Data List for Lesotho is greatly indebted to Olive Hilliard and Bill Burt, whose meticulous observations have made possible the inclusion of a great deal of detail and, indeed, a number of species that would otherwise not have appeared. The initiative for this list came from SABONET through the Red Data List Coordinator, Janice Golding, who has devoted much time, effort, encouragement, and patience. I should also like to acknowledge the staff of ROML, and in particular Moretloa Polaki of the National University of Lesotho Biology Department and Curator of the Herbarium. Khotso Kobisi and Puleg Matebesi of the Roma Herbarium staff were particularly helpful at Roma. I thank Lekhooa Fokothi and Belina Sejane of the Maseru Herbarium for their cooperation and help. I should also like to thank Dr M.W. Phoofole of the University Biology Department for his assistance and in particular facilitating access to microscope facilities. For assistance with maps and the locating of many of the sites mentioned, I thank David Ambrose of the National University of Lesotho, who also lived with this chapter through all its stages. Finally, I am indebted to many people, too numerous to mention, who have contributed in many and diverse ways a great variety of information which has helped to improve the Lesotho RDL.



***Boophane disticha*, abundant in Lesotho and South Africa, is heavily utilised for medicinal purposes in the Lesotho lowlands. (Photo: J.S. Golding)**

EXTINCT & THREATENED

ALOACEAE

Aloe broomii Schonland

Status: VU B1B2cb

Threats: Harvesting, collection, habitat degradation
This widely distributed aloe has a single poker-like inflorescence up to a metre long and a close rosette of spine-tipped leaves. The main centre of distribution for this species is in the Free State, Koroa, Eastern Cape and Northern Cape (South Africa). The species extends into western Lesotho which contains about 10% of the global distribution of this species. Its distribution extends into western Lesotho, and also patchily (although a proper survey is needed) up the Senqu Valley to beyond Linokeng. The species is restricted to riverbanks in Lesotho. Between 100 and 200 individuals estimated from Mahole's Hoek where its habitat is currently undisturbed. The species is utilised and there are cases where several sites in Lesotho have become extirpated due to habitat degradation. There are two forms—one with small bracts and conspicuous flowers, the other with large bracts that completely obscure the flower. Although varieties of this species are known to exist, only the species name is in use in Lesotho. The name *A. broomii* var. *broomii* is sometimes applied to the taxon in Lesotho.

Aloe polyphylla Schonland ex Pillans

Status: VU B1B2cbce

Endemism: Endemic?

Threats: Road network, collection

The most recent reports state that despite a limited survey, at least 17,000 plants are known to exist in the wild. During a comprehensive survey undertaken in 1999, many previously unrecorded sites were discovered. Although the species is known to be removed from lower-lying, more accessible areas for horticultural purposes, many individuals remain in the wild. The population is characterised by high levels of recruitment. Despite the species being harvested intensively for at least the last 50 years, the population seems to be stable. The species was assessed as Endangered by both Hilton-Taylor (1996a) and Scott-Shaw (1999). There is an unconfirmed locality in KwaZulu-Natal (South Africa). Scott-Shaw (1999) mentions an 'unconfirmed outlying population in the KZN Drakensberg', but without further evidence there is no reason to change the Lesotho endemic status of *A. polyphylla*. It is suspected that an additional locality in the Free State (South Africa) is now extinct, but only field surveys can confirm this.

Aloe pratensis Baker

Status: VU B1B2cbde

Threats: Harvesting

This small aloe, relatively common in South Africa, occurs in Lesotho only in a limited area of Qocho's Nek District (Jocot Guillormod 1971; ROML records from Hargreaves). Listed as Uncertain in Hilton-Taylor. Also found in the Eastern Cape and KwaZulu-Natal (South Africa). The distribution stretches from sea level in Grahamstown to Cathedral Peak and Champagne Castle on the eastern side of the Drakensberg (South Africa). It is distributed in a band in southern Lesotho.

AMARYLLIDACEAE

Boophane disticha (L.f.) Herb.

Status: EN A2d

Threats: Collection, harvesting

This plant has a massive bulb, the dry outer scales of which are used to dress wounds and boils and appear to have antiseptic properties. It is now being brought in from South Africa since there is a big demand. It was used as a source of arrow poison by the Son or Boroa who once lived in Lesotho before they were replaced by

pastoralists. Its endangered status applies only to Lesotho as it is widely distributed in southern Africa.

APIACEAE

Alepiea amatymbica Eckl. & Zeyh.

Status: VU A1A2d2d

Threats: Collection, urban expansion

A popular medicinal plant used for treating coughs and colds, fevers and rheumatism, this plant is actively collected for its roots. Formerly widespread in Lesotho, it is regarded as vulnerable in Lesotho, because it is not used sustainably. Whole localities have gone extinct. Found from near Moseru near human settlements and at Tes'itonyone in Leribe. It used to be found at the foot of the hill near Morokobei; now it is mostly restricted to the mountains. It is heavily utilised in the KwaZulu-Natal Midlands (South Africa). Widespread in summer rainfall areas of southern Africa. It is locally abundant where it is not exploited. It is used for cough remedies and colds. The plant is a reseeder. Scott-Shaw assesses it as LR-nt.

APONOGETONACEAE

Aponogeton ranunculiflorus Jacot Guill. & Marais

Status: CR B1B2d

Endemism: Near-endemic

Threats: Grazing, desiccation

First located in Sehlobothebe 'confined to pools up to 7 m deep in Cave Sandstone [Clarens] formation at about 2,600 m altitude' (Jocot Guillormod & Morois 1972). Jocot Guillormod (1978) published more finds by P. Cookingham who explored the South African side of the border fence within about 2 km of the nearest site in the Park and found some in pools in the sandstone at the same altitude. Schmitz (1982) reported another population discovered by John Jilbert, which is well inside Lesotho in clear pools in the bosolt of the Thobo-Putsoo Range 2,900 m (Sheet 23D) from John Jilbert.

ASCLEPIADACEAE

Brachystelma alpinum R.A. Dyer

Status: EX?

Endemism: Endemic

Type specimen come from near Romotseiso's Gate, Qocho's Nek District. (Holotype Boyliss 819, PRE) (Dyer 1980). It has not been found in the same area despite several searches by Hargreaves (1999). The possibility of finding it in a different area of Lesotho is not totally ruled out. Despite Scott-Shaw assessing it as VU D2, the assessment acknowledges that it is known from only the type locality and states that a future need is to find subpopulations of this species.

ASTERACEAE

Dicoma anomala Sand.

Status: VU A2d

Threats: Collection, habitat degradation

The root of 'hloeny' is used medicinally. On its own, or mixed with other herbs, it is used for a very broad range of ailments: aches and pains, diarrhoea and colic, rheumatism and fevers. It is also given to diabetics (Molhe 1997). It is found in the Lowlands and Foothills.

CRASSULACEAE

Crassula goathambensis Harg.

Status: EN A2cB1B2c

Endemism: Endemic

Threats: Urban expansion

This *Crassula* is an endemic of the summit plateau. The holotype, Hargreaves 4955, is from Tloeng Pass, Mokhotlong District at 3,270 m. Two subpopulations were seen in Soni Pass area 2,800 m (Hargreaves 1989b). There remains a distinct possibility that the species may be eaten by cattle at this locality.

CYATHEACEAE

Cyathea dregei Kunze

Alsophila dregei (Kunze) R.M. Tryon

Status: CR D

Threats: Habitat degradation

One old tree fern was recorded from Sehlobothebe. There is no confirmation that it is still surviving in the Park. Possibly extinct.

CYPERACEAE

Carex killickii Nelmes

Status: VU D2

Endemism: Near-endemic

This plant has been only found in a narrow zone on the Lesotho side of the eastern watershed (RSA sheet 2928AA, Lesotho sheet 28B). There is also a mention of this sedge in a checklist (Scott-Shaw 1998) for Tshelonyone (Lesotho sheet 15D, RSA sheet 2828CD), 130 km west of the escarpment. The species is known from Indomeni Dome and Castle Buttress (South Africa). Although it has a narrow distribution range, it does not appear in Hilton-Taylor or in Scott-Shaw. This species has been undercollected.

HYACINTHACEAE

Eucomis autumnalis (Mill.) Chitt. subsp. *clavata* (Baker) Reyneke

Status: VU A1acdA2cd

Threats: Collection, habitat degradation, fire
An extract from the bulb of this plant is given to women to relieve pain during childbirth. Great caution must be used because the plant is poisonous. Leaves are also used for dressing wounds, boils and sores, the juice being first expressed from stems onto wounds or sores (Rubbright 1995). Distribution throughout Moloti. Now it is mostly confined to the lower mountain sides, mainly on the east-facing slopes. Listed as Rare in Hilton-Taylor. Also found in KwaZulu-Natal (South Africa) and further afield in Swaziland.

Urginea saniensis Hilliard & B.L. Burt

Status: VU D2

Endemism: Near-endemic

This lily from Sani Top has been regarded as a Lesotho endemic by Hilliard (1990). However, Scott-Shaw (1999) records its distribution as 'KZN and Lesotho Drakensberg at Soni Pass' found in 'Drakensberg Alpine Tundra'. The species is known from bosolt rock sheets at 2,900 m. Listed as Uncertain in Hilton-Taylor. Scott-Shaw assessed it as Data Deficient.

LEGUMINOSAE: PAPILIONOIDEAE

Calpurnia robinoides (DC.) E. Mey.

Status: VU D1D2

Endemism: Near-endemic?

Threats: Urban expansion, fire

This is the accepted name in use in Lesotho. The wood of this small tree is used for house building and for firewood (Jocot Guillormod 1971). Individual trees have been seen near Koro-Koro and on the Mpetsona riverbank in Maseru District and at two localities in the Boro District. It has also been reported from the lower Senquynone, northeast of its confluence with the Senqu

(Eustan-Brawn 1996). Much of its distribution in Lesotha is fragmented, many not less than 500 m apart.

Lotononis listii Polhill

Status: CR B1B2abD

The genus *Lotononis* has a number of species, widely used by Basotha for the treatment of branchitis (Watt & Breyer-Brondwijk 1962). *Lotonis listii* is known from a small population in the upper Kara-Kara Valley and PRECIS records show four other Lesotha records, three from Maseru District and one from Mafeteng District. *L. stricta* has a similarly limited distribution, apparently due to over-collection.

Lotononis stricta (Eckl. & Zeyh.) B.-E.van Wyk

Status: EN C2aD

Threats: Collection, erosion, fire
Recent reports suggest that *L. stricta* has become rare in Lesotha. It is a medicinal plant. Only one plant was seen on the Qaaling plateau in Maseru and a small site at Ho Sekhabe on the western flank of Thaba-Telle in Maseru District has been reported. There is also a record from Blue Mountain Pass area. Older records include Hélène Jacattet at Whitehill, Qacha's Nek District c. 1910; Archibald at Thaba-Tshoeu, Mahale's Hoek District in 1946; and Compton at Likolobeng north of 'Mamalap, Berea District without date (all three cited in Jacat Guilmard (1971)).

MALVACEAE

Anisodonte gracilis Bates

Status: CR C2aD

This plant has been reduced in numbers through intensive land use in its habitat, which is river valleys in the south and west border areas of the Lowlands of Lesotha. Listed as Uncertain in Hilton-Taylor. Also known from Free State and the Eastern Cape (South Africa). Only found once in Lesotha, although only known from South Africa according to PRECIS.

MYRICACEAE

Morella serrata (Lam.) Killick

Myrica serrata Lam.

Status: VU C2a

Threats: Collection

A tree whose widely distributed, isolated occurrences in the Lowlands and Foothills suggest an earlier, much larger, distribution. Its roots are used for treating headaches and as an insurance against bad luck. It is also cut for fuel.

POACEAE

Ehrharta longigluma C.E.Hubb.

Status: CR C2a

Threats: Urban expansion

There are apparently just five records of this critically endangered grass: Haener 1747, Sehlabahebe, 1977; Hilliard & Burtt 15521, South KwaZulu-Natal Drakensberg; Morris 182 (ROML 3486), Lejane, 2,300 m, 1991; Smaak 7106 (ROML 3497), 22 km SW of Thaba-Tseka on road to Lesabeng, 2,800 m, 1990; Linder 6698, near Katse [= Mofika-Lisiu] Pass summit 3,200 m, 1998. Since the various collecting points are some distance apart, it is possible that this grass has simply been undercollected and its status may change. Listed in Scott-Shaw as LR-lc.

Thamnocalamus tessellatus (Nees) Soderstr. & R.P.Ellis

Status: VU D1

Threats: Collection

This bamboo, indigenous to southern Africa, is widely distributed in Lesotha in remoter areas. Typical subpopulations are made up of 250–300 individuals, which do not flower for many years and then all apparently flower simultaneously after which the plants die. Formerly, the bamboo was used for assegai handles

and far house construction, but newer methods of warfare and house building have reduced exploitation for these purposes.

PROTEACEAE

Protea caffra Meisn. subsp. caffra

Protea multibracteata E. Phillips

Status: EN B1B2abD

Threats: Collection

One large subpopulation and much reduced subpopulations in Mokhuonoone, while some are still left in a residual part (about 2 ha) of Levi's Nek Klaf.

Protea multibracteata E. Phillips

Status: CR C2a

Threats: Harvesting, grazing

This species was apparently present in Lesotha in the past. ROML has no specimens and the present status is uncertain.

Protea roupelliae Meisn.

Status: CR C2aD

Threats: Harvesting

Proteas in Lesotha are in decline. In most cases they seem to be ageing populations, which are not replacing plants that are cut or die. However, the best-known site in Butha-Butha District apparently has several thousand trees of *Protea caffra* Meisn. subsp. *caffra*. In Qacha's Nek District, just one plant of the species *P. subvestita* N.E.Br. survives in the Sehlabahebe National Park, but it was apparently previously more widespread, villages with the name Liqalabeng being markers of its former distribution. A report by F.K. Haener (1977) of *P. dracomantana* at Sehlabahebe is of a plant growing on the South African side of the border. Although all *Protea* species are protected by law, in practice they have little real chance of survival unless the local chief, as indeed is sometimes the case, takes a particular interest in their protection.

RUTACEAE

Agathosma ovata (Thunb.) Pillans

Status: VU A1cd

An attractive much-branched shrub with clusters of white flowers, the Oval-leaved Buchu is valued for its traditional medicinal properties. No records have been found after Madame Dieterlen's from Mayeni Mountain

in the south of Lesotha, and one specimen from E.H. Ashton more than 50 years ago. *A. ovata* used to be planted in gardens. It could be extinct in Lesotha. Also known from the Eastern Cape and KwaZulu-Natal (South Africa). Listed as Indeterminate in Hilton-Taylor. This species is generally utilised throughout its range.

SCROPHULARIACEAE

Jamesbrittenia beverlyana (Hilliard & B.L.Burtt) Hilliard

Status: VU D2

Endemism: Endemic

This endemic plant appears to be confined to a small area in Sehlabahebe Park in rocky soil under an overhang at about 2,325 m. The locality has been extensively surveyed but without success. Nothing is known about threats at the type locality, and the species quite likely still exists there.

Jamesbrittenia lesutica Hilliard

Status: VU D2

Endemism: Endemic

Threats: Urban expansion

Recorded specimens of this species have so far all been from Mokhatlang District in Lesotha and (Hilliard 1994) are N8G Campton 21604, 1949, Phutha (Makhatlang), 2,108 m, sheet 38A (holotype); BM [= Natural History Museum, London] Brooke 39, 1938, Phutha, 2,400 m, sheet 38A; m [= Botanische Staatssammlung, Munich], PRE Dohse 313, 1956, Phutha, 2,400 m, sheet 38A; PRE Liebenberg 5691, Meroreng an Sanqebethu, c. 2,500 m, sheet 39A (Lesotho sheet 38 = RSA sheet 2929AC; Lesotha sheet 39 = RSA sheet 2929AD). It has conspicuous white flowers. The species co-occurs with *Jamesbrittenia jurassica* but it has a much smaller distribution range.

TILIACEAE

Sparrmannia ricinocarpa (Eckl. & Zeyh.) Kuntze

Status: CR C2abD

Threats: Grazing, urban expansion

This shrub, although widespread in South Africa and Swaziland, seems to be critically threatened in Lesotha, since it is only known so far from a small group of bushes at Lancers' Gap. Known mainly from the Free State (South Africa).

ALOACEAE

Aloe aristata Haw.

Status: LR-nt

Threats: Harvesting

A small aloe with attractively spotted leaves. It has been offered for sale along the Mountain Road, probably because those selling it knew that *A. polyphylla* was highly, although illegally, marketable, and now that the supply is exhausted, this might be a marketable substitute. However, it seems that *A. aristata* is itself also becoming rare near the Mountain Road, because it is no longer offered for sale. In the 1950s, *A. aristata* could still be found on the slopes of the hillside at Batsabela near Maseru (sheet 32D, RSA sheet 29278C) (J. Jaques, pers. comm.). Known from the more inaccessible Foothills and Highlands. Found in the Karoo, Eastern Cape and KwaZulu-Natal (South Africa). Protected in the Drakensberg Ukhahlamba National Park along Lesotho's border with South Africa.

Aloe ferox Mill.

Status: LR-lc

Threats: Harvesting, urban expansion

This tree aloe, which can exceed 2 m in height, dominates north-facing hillsides in Quthing District, which are ablaze with their 500 mm-long vermilion flowering spikes in September and October. It can also be found in Mahole's Haek District and extends as far as the southern tip of Mafeteng District in the Makhaleng Valley. Indeed, Makhaleng derives its name from this species. Found at Mahole's Haek, Mafeteng (also Lifateng) and Tele Tele. Many other localities exist for this species, often adjacent to human settlements. It is claimed that the plant is not threatened, but several localities have become extinct in Lesotho. The species extends into Lesotho. It is found throughout the Eastern Cape, Western Cape, KwaZulu-Natal (South Africa). Lesotho contains about 5% of the global population. The leaves are harvested for medicinal purposes, usually in small quantities. The leaf extract is widely used medicinally, but apparently at present sustainably, so that there seems to be no major threat.

ASCLEPIADACEAE

Brachystelma perditum R.A.Dyer

Status: LR-nt

Threats: Habitat degradation

There are only two published records for this species: one (found in 1976) in Lesotho 'north of Rama's Gate' (Dyer 1980) and the type specimen (found in 1907) from Nyiginye, north of Ntabamhlope in Drakensberg foothills, 1,800 m, KwaZulu-Natal. Listed as Rare in Hilton-Taylor; also known from KwaZulu-Natal and Free State (South Africa).

HYPOXIDACEAE

Rhodohypoxis thodiana (Nel) Hilliard & B.L.Burtt

Status: LR-nt

Endemism: Near-endemic

Threats: Habitat degradation, grazing

Recorded (Hilliard 1990) as occurring in damp turf above 2,700 m, there are records from both sides of the Lesotho/KwaZulu-Natal border.

SCROPHULARIACEAE

Glumicalyx lesuticus Hilliard & B.L.Burtt

Status: LR-lc

Endemism: Endemic

Threats: Habitat degradation

The type specimen of this endemic species is from Sani Top at about 2,850 m. The species has been found at a

number of other widely dispersed localities from about 2,250 m to 3,230 m (Hilliard 1994). There is no apparent particular demand for the plant.

Jamesbrittenia jurassica (Hilliard & B.L.Burtt)

Hilliard

Status: LR-lc

Endemism: Near-endemic?

Threats: Grazing

What is known about this endemic species is well documented in Hilliard (1994). The type specimen is from Sani Top on the Lesotho side of the border at 2,900 m, and it forms a small flowery mat on bare gravelly ground between 2,500 m and 3,230 m above sea level. There is also a record from Oxbow (a colour slide in the Edinburgh herbarium) and Olive Hilliard comments that 'it is clearly widely distributed over the high mountains of Lesotho'.

Zaluzianskya oreophila Hilliard & B.L.Burtt

Status: LR-nt

Endemism: Near-endemic

The type specimen of this species of *Zaluzianskya* is from 2,900 m at Sani Top, Thaba-Tseka District, Lesotho (sheet 49A), and there are also records from the summit plateau nearby in KwaZulu-Natal (South Africa). There is another record from much farther west in Lesotho at Likalaneng (sheet 34C). This justifies placing it in the category of LR-nt rather than DD. Described by Hilliard (1994) as an 'Eastern Mountain endemic'.



High-altitude sandstone rock pools support fragile aquatic ecosystems in Lesotho. (Photo: SABONET)

ALOACEAE

Aloe ecklonis Salm-Dyck

Aloe kraussii Baker

Status: DD

There are seven specimens of *Aloe kraussii* in ROML collected in the Rama Valley by Schmitz or Hargreaves in the period 1974–1984. However, Reynolds (1950) observed that 'plants from western Basutoland appear to be *A. ecklonis* rather than *A. kraussii*'. There are several other Lawlands and Foothills records (Jacat Guilmard 1971). Listed as not being threatened in Hilton-Taylor. Also found in the Eastern Cape, KwaZulu-Natal (South Africa) and Swaziland (unconfirmed). Taxonomic uncertainty of this species in Lesotha.

ANACARDIACEAE

Rhus pyroides Burch. var. *gracilis* (Engl.) Burt Davy

Status: DD

Endemism: Endemic?

The population in Lesotha is not severely fragmented, but there are more than five localities. The variety is apparently known only from Lesotha but this cannot be established. The species co-occurs with *Rhus pyroides* var. *integrifolia*.

Smodingium argutum E.Mey. ex Sond.

Status: DD

The sap of this plant is a skin irritant and its pollen causes painful blisters in sensitive subjects, hence its name. Madame Dieterlen found it in 'Matalane Gorge, Leribe' (sheet 14A). One of her specimens is in MASE, but when examined, it seemed to be close to *Rhus bolusii*. The late chief Theka Maama (1905–81) claimed to be familiar with the tree and provided the Sesotho name, *seloane-se-mpshehetse* 'the monster that sailed me', which confirmed knowledge of its poisonous properties (Talukdar 1981). However, there has been no confirmed record of the tree for at least the past 50 years.

ASCLEPIADACEAE

Asclepias emimens (Harv.) Schltr.

Status: DD

There are five records of this asclepiad in ROML, three in MASE and one at SEHL (Kali & Hargreaves 1985) and it is also widespread in South Africa and Swaziland (Arnold & De Wet 1993). It does not appear to be rare. Listed as Vulnerable in Hilton-Taylor.

Asclepias xysmalobioides Hilliard & B.L.Burt

Status: DD

Endemism: Near-endemic

This species is locally common on the summit of the Malati (Hilliard & Burt 1986a). There are also records from the KwaZulu-Natal side of the watershed.

Cynanchum meyeri (Decne.) Schltr.

Status: DD

This species appears from Arnold & De Wet (1993) to be a Namibian rather than a Lesotha endemic. *C. viens* Dietr. has been collected in Lesotha (sheets 14A, 32D) by Madame Dieterlen and Miss Archibald. Listed as Vulnerable/Endangered in Hilton-Taylor. Recorded from the former Cape and Transvaal in South Africa.

Schizoglossum elingue N.E.Br. subsp. *purpureum* Kupicha

Status: DD

Endemism: Near-endemic?

Sehlabathebe has two records: Beverly 265, 1976; 497, 1976. Beverly 783 is from Kakstad, an Lesotha's

southeastern border. Found on an altitude of 2,000–2,700 m.

Schizoglossum montanum R.A.Dyer

Status: DD

Endemism: Near-endemic

Rubright (1995) collected *S. montanum* from Mosafeleng, Tsatsa-Lemeno Range Management Area, Qacha's Nek District (sheet 57D). It is also found in the mountains of KwaZulu-Natal (South Africa). An eastern mountain endemic. Listed as Rare in Hilton-Taylor. Scott-Shaw assesses it as LR-lc.

ASTERACEAE

Euryops evansii Schltr. subsp. *dendroides* B.Nord.

Status: DD

Endemism: Endemic

There is one recorded site for this subspecies from 'Maletsunyane Gorge at Semankang' (sheet 54A), where it was found by B. Nardensham. There is also one later 1995 record from Bakang, altitude 2,400 m (sheet 34C), Linder 6278, which is probably in the Balus Herbarium (AfriDev Consultants 1996).

Euryops inops B.Nord.

Status: DD

Endemism: Near-endemic?

Almost all reports of this plant are from Lesotha: Merareng in Makhatlang District (sheet 39A); Lesabeng in Thaba-Tseka District; and Oxbow in Butho-Buthe District. No herbarium records in Lesotha. Also in Cathedral Peak on the path to One Tree Hill (South Africa).

Gnaphalium griquense Hilliard & B.L.Burt

Status: DD

Endemism: Near-endemic?

Found in Sehlabathebe: Beverly 141 and Hoener 1821. *G. griquense* descends into neighbouring East Griqualand (Hilliard & Burt 1987). Listed as Rare in Hilton-Taylor. Also found in KwaZulu-Natal (South Africa).

Gymnopentzia bifurcata Benth.

Status: DD

There are eight records from several parts of Lesotha in ROML for this well-known shrub from both Foothills and Malati (1,800–3,000 m), and the species is listed in Arnold & De Wet (1993) as occurring in all four former provinces of South Africa. It is clearly neither rare nor data deficient. Listed as Rare/Vulnerable in Hilton-Taylor.

Helichrysum palustre Hilliard

Status: DD

Endemism: Near-endemic

The location for the type specimen of this *Helichrysum* is (Hilliard 1977) 'Lesotha, plateau at headwaters of Latheni river, c. 400 yards from exit of Bushman's River Pass, c. 3,050 m, Wright 753'. This description more likely fits the top of Giant's Castle Pass (in South Africa, but about 1 km from the Lesotha border) than it fits what is generally considered to be Bushman's River Pass, which is an alternative name for Langalibalele's Pass. Only in the second case would it be a Lesotha specimen. The plant is typically found in marshy areas over an apparently wide area because it has been found in the Bakang Valleyhead Fen (sheet 25B) (Schwabe 1992) and also near Mathae (sheet 17C) and near Sani Tap (sheet 49A) (both records from Hilliard (1977)). Assessed as DD by Scott-Shaw.

Othonna burtii B.Nord.

Status: DD

Endemism: Near-endemic

There are Lesotha records for this low shrub, which

forms cushions on exposed rocky surfaces, from Sehlabathebe (Haener 1900) and 'Oxbow summit plateau' [= Mohloselo, sheet 16B] (Hirst 1996, deposited in Edinburgh Botanical Garden Herbarium). It is also found in KwaZulu-Natal and the Eastern Cape (Hilliard & Burt 1987). Listed as Rare in Hilton-Taylor. Scott-Shaw lists it as LR-lc.

Senecio austromontanus Hilliard

Status: DD

Endemism: Near-endemic?

This plant has been recorded in Lesotha only from seepage areas and damp grassland at about 2,300–2,400 m in Sehlabathebe and nearby at Thomathu Pass (Hilliard & Burt 1987). It is widely distributed in elevated areas outside Lesotha including Swaziland (Arnold & De Wet 1993).

Senecio saniensis Hilliard & B.L.Burt

Status: DD

Endemism: Near-endemic

The type specimen for this species was collected by Mrs D.C. Grice in February 1972 (Hilliard 1977) at the summit of Sani Pass at an altitude of 2,865 m on southwest facing cliffs, a description which would place the collecting site just within KwaZulu-Natal. There is one PRECIS record from Lesotha. Scott-Shaw (1999) regards the plant as a KwaZulu-Natal Drakensberg endemic, occurring from Sani Pass to the headwaters of the Latheni River. Listed as Rare in Hilton-Taylor. Scott-Shaw records it as LR-lc.

BORAGINACEAE

Cynoglossum alticola Hilliard & B.L.Burt

Status: DD

Endemism: Endemic

The type specimen is from the slopes of Ben Macdhui at 2,623 m on Lesotha's southern border and the plant has been recorded from Mokhotlang at 2,286 m (Hilliard & Burt 1986b).

Ehretia rigida (Thunb.) Druce

Status: DD

Endemism: Near-endemic

Threats: Urban expansion

This small tree has a precarious fragmented faahald around Maseru, the capital. Another small area at Matseng Ha Sempe, 13 km north east of Maseru has just three individual bushes. The species has also been found on the south of the Mpepsano River bank and west and south of Oeme Plateau. Increasing urbanisation has apparently critically affected this species within Lesotha.

CAMPANULACEAE

Wahlenbergia doleritica Hilliard & B.L.Burt

Status: DD

Endemism: Near-endemic

Rare according to Hilton-Taylor (1996), this Drakensberg-Malati endemic is recorded from Thomathu Pass and on basalt cliffs at Sehlabathebe (Hilliard & Burt 1987) at about 2,500 m.

CRASSULACEAE

Crassula lanuginosa Harv. var. *pachystemon*

(Schonland & Baker f.) Toelken

Status: DD

Hargreaves (1991) found *C. lanuginosa* in two sites in Lesotha. There are viable populations in the Eastern Cape (South Africa). Listed as Rare in Hilton-Taylor.

CYPERACEAE

Carex monotropae Nelmex

Status: DD

Endemism: Near-endemic

This sedge has been found at a number of localities from the mountains of Makhatlang District as far as Sani Top, and has recently been found also nearby in KwaZulu-Natal (South Africa). Earlier PRECIS records were wholly from Lesatho. It needs to be monitored within the newly created Transfrantier Area.

DROPTERIDACEAE

Polystichum dracomontanum Schelpe & N.C. Anthony

Status: DD

Endemism: Near-endemic

This Malati-Drakensberg endemic fern occurs on the Drakensberg escarpment between 1,600 and 3,000 m (Schelpe & Anthony 1986) and has also been recorded at Sehlabathebe. Its habitat is along streambanks, boulder bases, screes and scrub, rarely also in forests. Found on lower Clarens Sandstone and Upper Basalt formations.

GERANIACEAE

Pelargonium oppositifolium Schltr.

Status: DD

Endemism: Endemic?

This species appears as a Lesotho endemic in Arnald & De Wet (1993), but from resources in Lesatho, no published reference could be found. There is also a report that the plant has recently been found.

HYACINTHACEAE

Scilla natalensis Planch.

Status: DD

This large blue scilla was recorded as long ago as a manuscript recording a journey of February 1840 (but only published 150 years later as Arbaussset (1991)). Arbaussset noted that there was a bulbous root covered by layers that wrap around each other like an onion. It was and is used for treating a wide variety of human and animal illnesses, and indeed Arbaussset observed 'there is no medicine it does not go into'. He saw the plant in the vicinity of Tsipa Ho Sekhabe (Lesatho sheet 24A, RSA sheet 2928AA). Distribution apparently Lawlands and Faathills, but there are few herbarium records, apart from Madame Dieterlen's collection from 'Motalane Gorge, Leribe District (sheet 14A).

HYPOXIDACEAE

Hypoxis hemerocallidea Fisch. & C.A. Mey.

Status: DD

Threats: Collection

Widely distributed in southern Africa, including Botswana and Swaziland, this species is heavily utilised in Lesatho for its underground corm, which is in demand for treating prostate problems and urinary infections (Van Wyk, Van Oudtshoorn & Gericke 1997). The only Lesatho herbarium specimen seems to be in MASE. However, it has also been recorded from Tsatsa-Lemena (sheet 57D) (Rubright 1995) and is being planted in Katse Botanical Garden as a rescue operation (Ntloka 2001).

IRIDACEAE

Dierama jucundum Hilliard

Status: DD

The type specimen is from the farm Fetcani Pass, near

Barkly East in the Eastern Cape (South Africa). This graceful flower has only ever been recorded twice and the other record is from Lesatho (Schmitz 7891 RQML and PRE). It was collected 'in a big tuft on a dry rocky slope, flowers pale mauve' in October 1977 between Mafeteng and Mahale's Haek (believed to be sheet 51C) in southern Lesatho about 120 km to the north-northwest of the first site. No further finds have been made of this attractive Dierama (Hilliard & Burt 1988; 1991).

Hesperantha crocopsis Hilliard & B.L. Burt

Status: DD

Endemism: Endemic

This species is regarded as a Lesatho endemic by Hilliard & Burt (1986c). The type specimen is from 'Lesatho, Makhatlang distr., above Mashai Pass, c. 2,870 m, 1977, Hilliard & Burt 10489 (E hala., NU isa.)'. There is a problem with this location, because neither of the two places known as Mashai Pass are in Makhatlang District, and both are higher than 2,870 m, which would better fit Sani Top. On balance it seems that the plant must have been collected at the Mashai Pass which straddles the Lesatho border (sheet 48D). Other recorded sites are Sani Top (sheet 49A) and 'Black Mountains' (= Katisephala) c. 3,050 m (sheet 48B). Hilliard & Burt remark that the plant is found in short wet turf, and flowers in November: 'it is certainly elsewhere in the mountains of Lesatho.'

Romulea luteoflora (M.P. de Vos) M.P. de Vos var.

sanisensis M.P. de Vos

Status: DD

Endemism: Near-endemic

Threats: Habitat degradation, grazing
The type specimen for this variety is from flat grassland at Sani Top on the Lesatho side of the border (De Vos 1983). It is obviously under threat from grazing animals. It is listed as Vulnerable in Hilton-Taylor. Scott-Shaw records it from KwaZulu-Natal (Cobhom) where it is Vulnerable.

LEGUMINOSAE: MIMOSOIDEAE

Elephantorrhiza elephantina (Burch.) Skeels

Status: DD

The crushed underground stem of this plant is used to stop bleeding and to treat syphilis and intestinal disorders. Distribution Lawlands and Faathills.

LEGUMINOSAE: PAPILIONOIDEAE

Lessertia glabricaulis L. Bolus

Status: DD

Endemism: Endemic

Threats: Grazing, erosion

This species is very rare as there is only one record in the PRECIS database, which is from the Makhaaneng Plateau near Pitseng (sheet 14D). There is also one specimen in MASE, as listed in Kali & Hargreaves (1985), but without details of collecting locality.

Lessertia thodei L. Bolus

Status: DD

Endemism: Near-endemic

Details of this legume, found at altitudes from 2,100–2,900 m on rocky grassland, are given by Hilliard & Burt (1987) who cite a Sehlabathebe record by Jacot Guillarmad, Getliffe & Mzamane (70). Also recorded from the Free State and KwaZulu-Natal (South Africa).

Rhynchosia dieterlenae Baker f.

Status: DD

Endemism: Endemic

Threats: Collection

According to Jacot Guillarmad (1971), the only record of this plant is from the 'Motalane Gorge (sheet 14A), Dieterlen 840'. The roots are used for medicinal purposes. The species has a taproot, so the entire plant is removed for usage.

MALVACEAE

Anisodonteia julii (Burch. ex DC.) Bates subsp.

prostrata (E. Mey. ex Turcz.) Bates

Status: DD

A very restricted wild population has been located in Tele-Tele in Quthing district close to the border with the Eastern Cape (May, in press), where it is also present. Known from near the former Transkei border. Probably occurs more widely in Lesatho, but is currently known only from a linear strip near the former Transkei. Herbarium specimens from Lesatho have localities mainly along the Free State border.

MESEMBRYANTHEMACEAE

Delosperma ashtonii L. Bolus

Status: DD

This is a high altitude mesembryanthemum also found in KwaZulu-Natal and the Eastern Cape (South Africa). Meakins, Hargreaves and Machaba (1988) recorded it from the Malibamatso and Bakang confluence at Katse now occupied by Katse Reservoir. There was a rescue operation in 1995 and 1996 to save the plants before inundation (Ntloka 2001).

Delosperma clavipes Lavis

Status: DD

Endemism: Endemic?

This is probably a Lesatho endemic, known from the wetlands at the top of the plateau behind Mafika-Lisui Pass (Meakins et al. 1988) and from the slopes of Machoche 2,880 m (Hargreaves 1989a).

Delosperma nubigenum (Schltr) L. Bolus

Status: DD

Hargreaves reported this yellow-flowering species also from Machoche (1989a). Hirst (1996) has published a photograph of *D. nubigenum* in The Rack Garden, without mentioning the locality.

Rabiea lesliei N.E. Br.

Status: DD

Endemism: Endemic

Threats: Urban expansion

The only record at present available in Lesatho for this mesembryanthemum is that it is listed as an apparent Lesatho endemic in Arnald & De Wet (1993). Known only from the Maseru area.

ORCHIDACEAE

Brownleea recurvata Sond.

Status: DD

This orchid has a widespread distribution in the Eastern Cape, extending just into the Western Cape and with an outlier in Mpumalanga (South Africa). There is a Lesatho record from Sehlabathebe (Haener 1800, 23 ii 1977).

Corycium alticola Parkman & Schelpe

Status: DD

Endemism: Endemic

This is quite a rare orchid, known only from a few widely dispersed locations in the Eastern Cape, KwaZulu-Natal and Lesatho (Linder & Kurzweil 1999): 'found in damp grassland from 1,950–2,400 m.' The only known Lesatho record seems to be from Thabana-Tsekanyana near Rama (sheet 33C).

Disa basutorum Schltr.

Status: DD

Endemism: Near-endemic

This orchid grows on damp turf slopes above 2,600 m (Hilliard & Burt 1987) and Scott-Shaw (1999) mentions 'summit of the Lesatho and KwaZulu-Natal Drakensberg'. The cited reference in Hilliard & Burt (1987) is Linder 1034, but the location is not given. This species is Data Deficient until more information is available. Scott-Shaw assesses it as LR-lc.

***Disa cephalotes* Rchb.f. subsp. *frigida* (Schltr.) H.P.Linder**
Status: DD
 Endemism: Near-endemic
 This high-altitude orchid subspecies is stated (Linder & Kurzweil 1999) to be 'rare in Lesotho and KwaZulu-Natal; in large or small populations in dry to damp grassland at 3,000 m on the summit of the Drakensberg'. Data deficient until extent of Lesotho occurrences is clarified. Listed as Rare in Hilton-Taylor. Also in Free State and possibly in KwaZulu-Natal (South Africa). Scott-Show assesses it as LR-lc.

***Disa oreophila* Bolus subsp. *erecta* H.P.Linder**
Status: DD
 Endemism: Near-endemic
 It is stated for this orchid subspecies (Linder & Kurzweil 1999) that 'it is occasional in the Drakensberg in the Eastern Cape, Lesotho and KwaZulu-Natal; on rock ledges and damp grassy slopes between 2,250 and 2,700 m, usually growing in soils derived from basalt'. Data deficient until extent of Lesotho occurrences is clarified. A record of this orchid is in MASE (Koli & Horgreaves 1985).

***Disa tripetaloides* (L.f.) N.E.Br.**
Status: DD
 Not a Lesotho species but a species of the Cape and KwaZulu-Natal coasts. Possibly the intention was to include *D. tysonii* which is found in the Eastern Cape and of which there are two known records from sheets 16A and 16C. Listed as Rare/Vulnerable in Hilton-Taylor.

***Satyrium microrrhynchum* Schltr.**
Status: DD
 This rare orchid is known from only six localities, stretching 470 km from Mpumalanga to the Eastern Cape (South Africa). It is found on grassy and sometimes stony or moist slopes from 1,600–3,300 m (Linder & Kurzweil 1999). There is one Lesotho record, Hoener 1972 from the Rock Pools area in Sehlabathebe (Hoener 1979). Scott-Show assesses it as LR-lc.

POACEAE

***Agrostis subulifolia* Stapf**
Status: DD
 Endemism: Near-endemic
 There are several records of this grass from Lesotho. RDML specimens include Morris from Ho Lejone and Killick from Dxbow. Bockéus' specimens from Kholong-lo-Lithunyo 3,240 m (sheet 17C), and also from the southwest of Mont-oux-Sources are in Sweden (UPS) (Bockéus 1988). Subalpine grassland to Drakensberg Alpine Tundra and occupies damp sites mainly in sedge meadows. Listed in Scott-Show as LR-lc. It is also found in South Africa (KwaZulu-Natal).

***Anthoxanthum brevifolium* Stapf**
Status: DD
 Endemism: Near-endemic
 Subalpine grassland to Drakensberg Alpine Tundra and occupies damp sites mainly in sedge meadows. Listed in Scott-Show as LR-lc. This is a rare Drakensberg endemic. It is also found in KwaZulu-Natal (South Africa). Gibbs Russell et al. (1990) state that except for the very short and broad leaf blades, this species cannot be separated from *A. ecklonii*, and therefore cannot be regarded as a separate taxon. Sixteen specimens of *A. ecklonii* at RDML and six at MASE were measured. There was a wide range in leaf sizes and the broadest ones were not necessarily short. From Lesotho collections it is not possible to separate *A. brevifolium* from *A. ecklonii*.

***Aristida monticola* Hern.**
Status: DD
 Endemism: Near-endemic
 This is a high altitude grass from the eastern mountains. RDML has a specimen collected by Du Toit in 1977 between Bushmen's Nek and Sehlabathebe (RDML 1863) at 2,400 m. This record, because of its altitude, probably refers to Lesotho. Scott-Show (1998) mentions

this grass, but provides no clear record from Tshelonyone or Upper Bokong. The grass is known from high altitude sedge meadows in KwaZulu-Natal. It is presumably a Moloti–Drakensberg endemic, but definite Lesotho records are still needed. Listed in Scott-Show as LR-lc.

***Bromus firmior* (Nees) Stapf**
Status: DD
 Endemism: Near-endemic
 This grass, which also occurs in the Free State and KwaZulu-Natal, is 'locally common in Senqunyone valley, also in Bokong and Jordane valleys altitude 2,400 m 2928AC' (AfriDev Consultants 1996). There is a duplicate RDML record from sheet 34C. It is likely that it will be found elsewhere in Lesotho. Listed in Scott-Show as LR-lc.

***Colpodium drakensbergense* Hedberg & I.Hedberg**
Colpodium hedbergii (Melderis) Tzevelev
Status: DD
 Endemism: Near-endemic?
 This grass genus is confined to the 'archipelago' of high African mountain summits (White 1978), and this particular species has been found in Lesotho (Schmitz 1984). Listed as Rare in Hilton-Taylor. Also in KwaZulu-Natal (South Africa).

***Festuca dracomontana* H.P.Linder**
Status: DD
 Endemism: Near-endemic
 Threats: Habitat degradation
 High-altitude grass. The type specimen is from a slope bordering Letsheng-lo-Letsie, sheet 74B (RSA sheet 3028AC) (Linder 1986). RDML has a duplicate from P.C.V. du Toit 2714, also from near Letsheng-lo-Letsie. The grass is mentioned in Scott-Show's 1998 checklist from Bokong, Leribe District (presumably sheet 25B), but with no details about exact locality. *F. dracomontana* also occurs in the Mpumalanga Drakensberg, far north of Lesotho (Arnold & De Wet 1993). Recent high rates of cattle theft between southern Lesotho and the Eastern Cape have resulted in sufficient insecurity in the border zone that people can no longer graze animals there. As a result the grassland (including that around the lake (Letsheng-lo-Letsie)) has recovered from its previously overgrazed status, although this may only be a temporary phenomenon. Listed as Rare in Hilton-Taylor.

***Festuca killickii* Kenn.-O'Byrne**
Status: DD
 Endemism: Near-endemic
 Threats: Habitat degradation
 This grass has a wider distribution than *Urginea saniensis*. It is confined to high areas in the Drakensberg from 1,980–2,500 m, and was found by D'Byrne at Sehlabathebe, which is the only Lesotho record. Listed in Scott-Show as LR-lc.

***Merxmuellera aureocephala* (J.G.Anderson) Conert**
Status: DD
 Endemism: Near-endemic
 Threats: Grazing, fire
 Although there are no records from Lesotho, this species is likely to occur here, because it has been recorded on basalt slopes and sandstone ridges in the southern KwaZulu-Natal Drakensberg (South Africa) (Hilliard & Burt 1987). Listed in Scott-Show as LR-lc.

***Merxmuellera guillarmodiae* Conert**
Status: DD
 Endemism: Near-endemic
 Threats: Grazing, fire
 There is one specimen in RDML from Soni Top in Lesotho (sheet 59A), P.C.V. du Toit 2206, collected in 1977 on top of the escarpment on dark brown gritty, gravelly, loamy, humus-rich soil (illustrated in Koli & Horgreaves (1985)). It has also been found in the LHWP Phase 1A Area (Loxton, Venn & Associates 1993). This grass also occurs in KwaZulu-Natal (Arnold & De Wet 1993). Listed in Scott-Show as LR-lc.

***Pentastichis praecox* H.P.Linder**
Status: DD
 Endemism: Near-endemic
 Threats: Grazing, fire
 This high-altitude grass appears as a Lesotho endemic in Gibbs Russell et al. (1990) and Arnold & De Wet (1993). The distribution shows two locations within Lesotho near the eastern border, and the plant is said to flower in September and to be found in 'sour grassland in the montane belt' (Gibbs Russell et al. 1990). A reference to Linder & Ellis (1990) is given in Gibbs Russell et al. (1990), but without full citation details. Scott-Show assesses it as LR-lc and considers it a rare Drakensberg endemic.

***Phacelurus franksiae* (J.M.Wood) Clayton**
Status: DD
 Endemism: Near-endemic
 Threats: Grazing, fire
 This has been mentioned as a KwaZulu-Natal grass by Hilliard & Burt (1987), but there is no known Lesotho record. Listed in Scott-Show as LR-lc.

***Setaria obscura* de Wit**
Status: DD
 Endemism: Near-endemic
 Threats: Habitat degradation, grazing, fire
 This plant appears to be a KwaZulu-Natal endemic. Listed in Scott-Show as LR-lc.

PORTULACACEAE

***Anacampseros rufescens* (Haw.) Sweet**
Status: DD
 Definite Lesotho records of this species are over 40 years old, PRE Dieterlen 625 from Leribe and Poroz from Thobano-Moreno (Jacot Guillarmod 1971). *Anacampseros* material in RDML collected by Horgreaves (Horgreaves & Koli (1985), 3744 and 3751) still has to be identified to species level. Listed as Indeterminate in Hilton-Taylor; also listed in the Eastern Cape, KwaZulu-Natal, Free State (South Africa) and Swaziland. According to PRECIS, this species occurs only in South Africa.

ROSACEAE

***Prunus africana* (Hook.f.) Kalkm.**
Status: DD
 This tree was collected by Hoener FKH 2027 from the Rock Pools area in the shelter of a sandstone outcrop in Sehlabathebe, 1978. This is the only known record from Lesotho, and the tree no longer survives. The species occurs nearby, east of the escarpment, and seeds may be dispersed by birds. It closely resembles *Prunus serotina*, an exotic. *P. serotina* has been planted on the university campus; there have been several examples of trees coming up in the wild as a result of bird dispersal. One specimen was observed in the Maphotong Gorge. Widely known from many countries in Africa.

THYMELAEACEAE

***Dais cotinifolia* L.**
Status: DD
 Unlike *Morella serrata*, *Dais cotinifolia* has both a present and known past limited distribution close to Berea Mission, on escarpments northeast of Lesotho's capital. The one exception to this is a record by Scott-Show (1998) from Tshelonyone (Lesotho sheet 15D, RSA sheet 2828CD). The species could have been introduced to Lesotho.

***Gnidia singularis* Hilliard**
Status: DD
 Endemism: Endemic
 There is a single record for this plant from the Lesotho side of the border in the Soni Top area (Arnold & De Wet 1993). It was assessed by Hilton-Taylor as Indeterminate.



Gladys Msekandiana* & Enoch Mlangeni*

Introduction

Malawi is a small country (118,000 km²) with a total land area of 94,276 km²; the remainder is made up by Lake Malawi. The country is divided into three regions—Northern, Central, and Southern Regions—and is characterised by widely varied relief patterns throughout its entire area. A total of 53 natural regions have been identified (Agnew & Stubbs 1971). The most important of the relief features include the Rift Valley Scarp Zone (most prominent in the north), Lakeshore plains and the Shire Valley (at about 60 m altitude with a hot climate), a high plateau and plains, and the high-altitude hill zone. These variations in relief—steep habitat gradients in a heterogenous environment—are reflected in the floristic diversity of the country. Indigenous vegetation is predominantly semi-deciduous; miombo woodlands are commonly typified by *Brachystegia* and *Julbernardia* species. The known key areas of endemism include Mount Mulanje in the south and the Nyika Plateau in the north; both lie mostly above

the 2,000 m altitude contour.

The floristic composition of Mount Mulanje comprises mostly *Widdringtonia* forest, thicket, shrub, and grassland. Historically, Mount Mulanje has 50 km² of Afromontane forest (montane and sub-montane) and approximately 18 km² of mid-altitude forest on its slopes and gorges.

The Nyika Plateau is shared with Zambia and comprises a diversity of forest and grassland species. The slopes below 1,900 m a.s.l. consist primarily of *Brachystegia* woodland and are poorly known compared to the plateau area (La Croix *et al.* 1991).

Unfortunately, the forests of Mount Mulanje and those bordering the Nyika National Park are at the moment facing a growing threat from human influence. Malawi is one of the most densely populated countries in sub-Saharan Africa with a population growth rate of 3.3% per annum (Ministry of Forestry, Fisheries and Environmental Affairs 1998). Some 85% of the population depends on subsistence ag-



Ruo Gorge (Mount Mulanje) destruction by tea estates. (Photo: J. Burrows)

*National Herbarium, Zomba, Malawi

Capital: Lilongwe, largest city is Blantyre

Area: 118,484 km²

Languages: English, Chewa (both official), Lomwe, Tumbuka, Yao

Currency: Malawian kwacha (MK)

Total plant species: 5,500

Total plant endemics: 122

Total RDL plants: 247

Focal RDL institutions: MAL, PRE

Number of Protected Areas: five National Parks, several Game Reserves and Forest Reserves and a proposed Transfrontier Park.

Population: 10,787,800 **Growth Rate:** 3.3% **Density:** 109.2 people/km²

Phytogeography: Predominantly Zambezian with frequent Afromontane elements.

Flora: Predominantly miombo woodland, with drier Zambezian woodland in the south, montane forest and grassland at higher elevations, and patches of lowland forest on the shores of the northern part of Lake Malawi, Nyika Plateau, and the lower slopes of Mount Mulanje.

Sources: Anonymous 2000, White 1983

riculture. Fuelwood accounts for 93% of Malawi's energy consumption, and the rate of deforestation is estimated at 3.4% per annum—this being the highest in southern Africa (Ministry of Forestry, Fisheries and Environmental Affairs 1998). There is, therefore, enormous human pressure on natural forests. In unprotected areas, the forests occur mostly on customary land and consequently the rate of biodiversity loss is suspected to be very high. This creates the need for a RDL for Malawi, a prerequisite for establishing conservation priorities.

Methods

As a starting point, a draft RDL was compiled from the literature and the list was circulated to various specialists. The IUCN 1994 system was used; inferences to deal with uncertainty (relating to distribution range and the extent of threats) were based on methods outlined in Golding & Smith (2001).

Institutions that were directly involved in compiling the RDL were Kew, the National Herbarium and Botanic Garden of Malawi, the Forestry Research Institute of Malawi, Chancellor College, and the SADC Gene Bank.

Results and Discussion

Malawi has a total number of 5,000–6,000 species. A total of 248 RDL taxa is presented here (Table 1). About 52% (128 taxa) is regarded as threatened (*Critically Endangered*, *Endangered* or *Vulnerable*). A large proportion of taxa (63) has been categorised as *Data Deficient*.

Some 114 of these taxa (50%) are confirmed as being restricted to Malawi and a further eight are probably endemic. Thirty-one are near-endemic (distributed in ad-



Pit-saw activities taking place in evergreen forest areas in southern Malawi. (Photo: SABONET)

jacent areas of neighbouring countries). The list of endemic taxa presented here is based on the list compiled by Hargreaves (1982), with additional information extracted from volumes of *Flora zambesiaca* and related publications. There is a need for the production of a national checklist and for a list of endemics.

The families with the highest representation on the RDL are the Orchidaceae (51), Asteraceae (22), Aloaceae (18), and Rubiaceae (18). This is probably because more information is available for charismatic families such as the orchids than for less charismatic groups (La Croix *et al.* 1991). It is unlikely that these skewed figures represent the reality of species loss in Malawi; the figures should be seen as a starting point for further research.

Threats

The major threats to plant species in Ma-

lawi are:

- Habitat loss through human settlements
- Alien plant infestations
- Forestry exploitation targeted towards removing certain woody species
- Fire
- Agriculture
- Urban expansion
- Afforestation
- Deforestation
- Other species are harvested for medicinal purposes (*Prunus africana* and *Warburgia sahutaria*), and timber and fuelwood or charcoal (*Pteleopsis myrtifolia*, *Psychotria zombamontana*, and *Ixora* species).

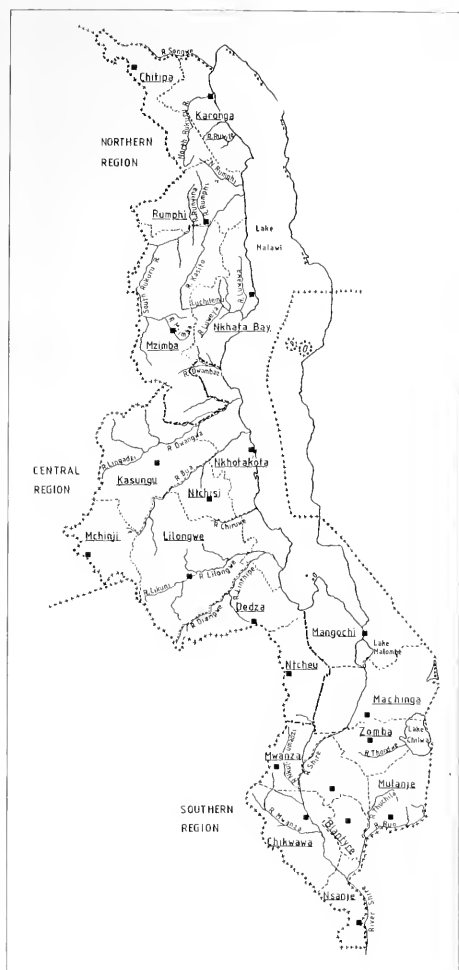
The possibility of bauxite mining on Mount Mulanje may also pose a threat to most species there. It is noteworthy that a large number of the endemic plants of Malawi are found on Mount Mulanje. Perhaps Mulanje ought to be made a National Park to preserve its unique plants in the same way that unique animals have been preserved elsewhere.

Wildfires

Wildfires are definitely a threat to indigenous species in Malawi. In Malawi, plantation fires are monitored by an elaborate system, but natural forests are not monitored with similar vigilance. Data on the frequency of fires, the extent of the damage, the time of the year that fires occur, and whether or not fires occur mostly during the day or night, are not available. This lack of basic data makes fire management very difficult.

Table 1. Results of RDL assessment for Malawi.

Category	Number of taxa
Total species in Malawi	5,000–6,000
Listed on the RDL	247
Endemics	114
Possibly endemic	8
Near-endemics	31
Possibly near-endemic	1
Extinct (EX)	5
Critically Endangered (CR)	25
Endangered (EN)	14
Vulnerable (VU)	89
Lower-Risk near threatened (LR-nt)	24
Lower-Risk least concern (LR-lc)	27
Data Deficient (DD)	63



National map of Malawi.

Human Pressure on Indigenous Species

The increase in human population results in an increase in the demand for services and products offered by the forests, more land for settlement and cultivation of crops that may lead to deforestation, and a possibility for some species to go extinct (globally, locally, or regionally). In Malawi, there is also an increased demand for edible tubers of orchids belonging to the genera *Habenaria*, *Satyrion*, and *Disa*. There are also other orchid species that are used for making *chikanda*, an edible product that is also sold on the markets (this is also the case in Zambia).

Invasive Species

The most serious invasive species in Malawi are *Lantana camara*, *Rubus ellipticus*, and *Prosopis*. Some RDL taxa that have been affected are *Phyllanthus confusus*, *Rhus monticola*, *Erica nyanana*, *Helichrysum whyteanum*, and *Lopholaena whyteana*.



Participants at the Red List Workshop held in Mangochi. (Photo: J.S. Golding)

Other invasive species that affect aquatic life are *Eichhornia crassipes*, *Salvinia molesta*, *Myriophyllum aquaticum*, and *Azolla filiculoides*.

Other Threatened Species

In Malawi we have other species that are also considered threatened because of their utility (Campbell 1996). These species, although widespread beyond the borders of Malawi, have been excluded from the RDL owing to a lack of data relating to trade, rate of utilisation, and regeneration statistics. *Widdingtonia nodiflora*, *Colophospermum mopane*, and *Khaya anthotheca* are

used as timber, for charcoal production, and fuelwood. Two major species that are heavily harvested in Malawi for carvings are *Combretum imberbe* and *Dalbergia melanoxylon*. These species need to be monitored because they are fast becoming rare in Malawi.

Conclusions

The Government of Malawi, recognising the importance of biological diversity in the socio-economic development of the country, and realising the severe ongoing destruction of ecosystems and habitats, has put in place various policies, legislation, strategies, and programmes to curtail the destruction of biological resources. The National Environmental Action Plan (NEAP) clearly spells out strategies and action plans needed to conserve, sustainably utilise, and manage the country's biological resources. Through the mandate of the Department of Research and Environmental Affairs, Government ensures that all sectoral policies are harmo-

nised. The Department of Environmental Affairs produced an Environmental Management Bill that is aimed at providing a legal framework for regulating the conservation and management of all the natural, biological, and environmental concerns in the country. The Bill spells out that the biological diversity should be determined as far as possible, in terms of threatened species, and that strategies should be devised for the better protection and conservation of rare and endemic species of fauna and flora. The Bill also states that rescued species should be re-introduced into their natural habitats. The Bill has already been passed by Parliament (Seyani & Kamundi 1997).

Malawi is a developing country and industrialisation and urbanisation are on the increase. This merits the monitoring of threatened taxa to prevent local, regional, and global extinctions.

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EXTINCT & THREATENED

ACANTHACEAE

Isoglossa milanjiensis S.Moore

Status: CR B1B2c

Endemism: Endemic

Threats: Forestry exploitation, alien plant infestation, fire

Distribution: South

Restricted to Mount Mulanje.

ALOACEAE

Aloe arborescens Mill.

Status: VU B1B2c

Threats: Agriculture

Distribution: South, Central

On mountain tops in Southern and Central Province. Widespread on Mount Mulanje. There may still be one or two remaining localities on the top of the mountains surrounding Blantyre. Habitat is declining. However, it is very well protected. Well represented and widely distributed outside Malawi.

Aloe buchananii Baker

Status: EN B1B2bcdC2a

Distribution: South, Central

Found throughout most of the southern highlands. It is isolated on a few mountain tops. Widely distributed outside Malawi.

Aloe bulbicaulis Christian

Status: VU D2

Aloe buettneri A.Berger

Distribution: South, Central

There may be many individuals. No specimens in Malawi's National Herbarium. Also known to occur in Zambia, Angola, Tanzania, Zimbabwe and so forth.

Aloe cameroni Hemsley var. *dedzana* Reynolds

Status: CR B1B2bc

Endemism: Endemic

Threats: Agriculture, forestry exploitation

Distribution: Central

Several field surveys have been unable to find it in the wild. Well-known from cultivation. Last seen in 1980 on the escarpment just below Dedza Mountain. Very unlikely that it still exists in the wild.

Aloe cannellii L.C.Leach

Status: CR B1B2bdeD

Threats: Habitat degradation

Distribution: Central

Commonly thought to only occur in Mozambique.

However, there is an account of the species occurring in central Malawi where there is much habitat degradation. This may need further investigation.

Aloe chabaudii Schonland var. *chabaudii*

Status: CR B1B2bcC2a

Threats: Habitat degradation, collection

Distribution: South, Central, North

There are two forms of *Aloe chabaudii*, namely *Aloe chabaudii* var. *milanjanus*—not confined to Mount Mulanje as the name suggests—and *Aloe chabaudii* var. *chabaudii*. The latter consists mainly of two very widely separated subpopulations. The main subpopulation in the extreme south is 10 x 20 m. The other subpopulations are much smaller. The distribution range is wide.

Aloe cryptopoda Baker

Status: VU B1B2bce

Distribution: South, Central

The distribution range is wide, but subpopulations are patchy and discrete. Usually on rocks near water.

Aloe excelsa Berger var. *brevifolia* L.C.Leach

Status: CR B1B2cde D

Distribution: South

Now sunk under *A. excelsa*. However, the varietal name is still in use in Malawi.

Aloe greatheadii Schonland

Status: CR B1B2ceD

Distribution: South

Widely distributed in other countries. Also referred to as *A. greatheadii* var. *greatheadii* but the varietal name is seldom used in Malawi.

Aloe lateritia Engl.

Status: CR B1B2cD

Threats: Habitat degradation, urban expansion

Distribution: North

Well represented outside Malawi. Also referred to as *A. lateritia* var. *lateritia* but the varietal name is seldom used in Malawi.

Aloe mawii Christian

Status: VU C1C2a

Distribution: South, North

Also known from Tanzania and Mozambique.

Aloe myriacantha (Haw.) Schult. & J.H.Schult.

Status: VU C1 C2a

Threats: Habitat degradation, urban expansion

Distribution: South, Central, North

Used to be on the Kirk Range but not found there anymore. Apparently reported from the Mofingos (Zambia); not found on the Nyika. Only four reported instances in Malawi although no specimens in the Malawi National Herbarium. Also recorded from South Africa, through to Kenya and Tanzania. Looks like grass and grows in grass, so very inconspicuous.

Aloe suffulta Reynolds

Status: CR B1B2cdeD

Threats: Habitat degradation, urban expansion

Distribution: South

This species could be extinct by now. Restricted to southern Malawi. Commonly thought only to occur in Zimbabwe and Mozambique. However, reported to also occur in Malawi.

Aloe swynnertonii Rendle

Status: VU A1aB1B2deC2a

Threats: Fire

Distribution: South, Central

Taxonomic uncertainty that needs to be resolved.

Kniphofia monticola S.Blackmore

Status: VU D2

Endemism: Endemic

Distribution: South

Restricted to Mount Mulanje. Initially suggested to be categorised as Data Deficient.

Kniphofia mulanjeana S.Blackmore

Status: VU D2

Endemism: Endemic

Distribution: South

Initially suggested to be categorised as Data Deficient.

ANACARDIACEAE

Rhus monticola Meikle

Status: VU B1B2cD2

Endemism: Endemic

Threats: Fire, invasive species

Distribution: South

Restricted to Mount Mulanje.

APIACEAE

Pimpinella mulanjensis C.C.Towns.

Status: VU B1B2cD2

Endemism: Endemic

Threats: Fire, invasive species

Distribution: South

Restricted to Mount Mulanje.

ASTERACEAE

Aster milanjanus S.Moore

Status: VU B1B2cD2

Endemism: Endemic

Threats: Fire

Distribution: South

Restricted to Mount Mulanje.

Berkheya johnstoniana Britten

Status: CR B1B2c

Endemism: Endemic

Threats: Fire, alien plant infestation, mining

Distribution: South

Restricted to Mount Mulanje. The development of a bauxite mine could be a threat.

Bothriocline milanjiensis (S.Moore) Wild & G.V.Pope

Status: VU B1B2cD2

Endemism: Endemic

Threats: Fire

Distribution: South

Restricted to Mount Mulanje.

Brachythrix sonchoides Wild & G.V.Pope

Status: VU B1B2cD2

Endemism: Near-endemic

Threats: Habitat degradation

Distribution: North

In Malawi, this species is found only on the Nyika Plateau. The locality in Zambia is about 160 km east, and the distribution is probably continuous. Known from fewer than five herbarium collections.

Helichrysum bullatum S.Moore

Status: VU B1B2cD2

Endemism: Endemic

Threats: Fire, alien plant infestation

Distribution: South

Restricted to Mount Mulanje.

Helichrysum densiflorum Oliv. subsp. *densiflorum*

Status: VU B1B2cD2

Endemism: Endemic

Threats: Fire, alien plant infestation

Distribution: South

Restricted to Mount Mulanje.

Helichrysum dichroölepis Brenan

Status: VU D2

Endemism: Near-endemic

Distribution: South

The taxonomic identity of this species may be in dispute.

Helichrysum hilliardiae Wild

Status: VU B1B2cD2

Endemism: Near-endemic

Threats: Habitat degradation

Distribution: North

Known only from the Nyika Plateau. Known from about five collections at three localities, one of which is unspecified in Zambia. Found in secondary forest at stream sides or in swampy ground. Possibly affected by tourist or visitor impacts.

Helichrysum palioides B.L.Burt
Status: VU B1B2cD2
Endemism: Endemic
Threats: Fire, alien plant infestation
Distribution: South
*The identity of this species may be questionable.
Restricted to Maunt Mulanje.*

Helichrysum sordidum S.Moore
Status: CR B1B2c
Endemism: Endemic
Threats: Fire, alien plant infestation
Distribution: South
*The identity of this species may be questionable.
Restricted to Mount Mulanje.*

Helichrysum tithonioides Wild
Status: VU B1B2c
Endemism: Endemic
Threats: Habitat degradation
Distribution: North
Restricted to Nyika Plateau. Found in swampy marshy ground. The species is represented by a number of collections, which implies that it is common or fairly conspicuous (locally abundant). Possibly affected by tourist or visitor impacts.

Helichrysum whyteanum Britten
Status: VU B1B2cD2
Endemism: Endemic
Threats: Fire, alien plant infestation, forestry exploitation
Distribution: South
Restricted to Maunt Mulanje.

Laphalaena whyteana (Britten) Phill. & C.A.Sm.
Status: VU B1B2cD2
Endemism: Endemic
Threats: Fire, alien plant infestation
Distribution: South
Restricted to Maunt Mulanje.

Senecia peltaphorus Brenan
Status: VU D2
Endemism: Endemic
Distribution: South
Restricted to Maunt Mulanje. The identity of this species may be questionable.

Vernania fractiflexa Wild
Status: VU B1B2cD2
Endemism: Endemic
Distribution: North
Restricted to the Nyika Plateau. Known only from the type collection. Several surveys have taken place in the vicinity of the type locality, yet this species has not been collected again.

Vernonia kawoziensis F.G.Davies
Status: VU B1B2cD2
Endemism: Endemic
Threats: Habitat degradation
Distribution: North
Restricted to the Nyika Plateau. Known from only two collections at the type locality. The species grows in Brachystegia woodland at an altitude of 1,890 m.

Vernonia milaniana S.Moore
Status: VU B1B2cD2
Endemism: Endemic
Threats: Fire, alien plant infestation
Distribution: South
Restricted to Maunt Mulanje.

BALSAMINACEAE

Impatiens quisqualis Launert
Status: CR B1B2c
Endemism: Endemic
Threats: Afforestation, deforestation
Distribution: South
Restricted to Maunt Mulanje.

Impatiens shirensis Baker f.
Status: VU B1B2cD2
Endemism: Endemic
Threats: Habitat degradation, forestry exploitation
Distribution: South
Restricted to Maunt Mulanje. The habitat is known to be threatened by pitsaw activities.

BEGONIACEAE

Begonia nyassensis Irmsch.
Status: VU D2
Endemism: Endemic
Distribution: South
Restricted to Maunt Mulanje.

BUXACEAE

Buxus nyasica Hutch.
Status: EN B1B2ac
Endemism: Endemic?
Distribution: South, North, Central
Restricted to Maunt Mulanje, but uncertain.

CANELLACEAE

Warburgia salutaris (Bertol.f.) Chiov.
Status: EN A1acd
Threats: Collection
Distribution: South
Harvested for medicinal purposes. Also recorded from Zimbabwe, South Africa, Swaziland and possibly other countries.

CAPPARACEAE

Cleome densifolia C.H.Wright
Status: CR B1B2c
Endemism: Endemic
Threats: Habitat degradation, forestry exploitation
Distribution: South
The habitat is known to be threatened by pitsaw activities.

CRASSULACEAE

Crassula globularioides Britten forma pilosa R.Fern.
Status: VU D2
Endemism: Endemic
Distribution: South
Restricted to Maunt Mulanje.

Crassula sarcocaulis Eckl. & Zeyh. subsp. rupicala Toelken var. milaniana R.Fern.
Status: VU D2
Endemism: Endemic
Distribution: South
Restricted to Maunt Mulanje.

CUPRESSACEAE

Juniperus procera Endl.
Status: EN B1B2cD2
Distribution: North
Also recorded from Zimbabwe, East Africa and Central Africa. There is evidence of poor regeneration owing to fire exclusion at the Nyika Plateau.

Widdingtonia whytei Rendle
Status: EN A1abcd B1B2abcde
Endemism: Endemic
Threats: Forestry exploitation, alien plant infestations, fire
Distribution: South
Restricted to Maunt Mulanje. Patches of forest associated with high peaks. The habitat is known to be threatened by pitsaw activities. Alien plant infestation

of Pinus patula is a serious threat. The area is protected by a number of firebreaks.

CYATHEACEAE

Cyathea mossambicensis Baker
Status: VU D2
Threats: Habitat degradation
Distribution: North
Species has a restricted distribution. Apparently also known from Mozambique and Zimbabwe.

CYPERACEAE

Pycnus spissiflorus C.B.Clarke
Status: VU D2
Endemism: Endemic
Distribution: South
Restricted to Maunt Mulanje.

Tetraria milanensis J.Raynal
Status: CR B1B2c
Endemism: Endemic?
Threats: Fire
Distribution: South
Restricted to Maunt Mulanje. However, it has been reported that the species may also exist in Barberton, South Africa.

ERICACEAE

Erica austrorossana Alm & T.C.E.Fr.
Status: VU D2
Endemism: Endemic
Distribution: South
Restricted to Maunt Mulanje.

Erica nyassana (Alm & T.C.E.Fr.) E.G.H.Oliv.
Status: VU B1B2cD2
Endemism: Endemic
Threats: Fire, alien plant infestation
Distribution: South
Restricted to Maunt Mulanje.

EUPHORBIACEAE

Clusia brassii Brenan
Status: CR B1B2c
Endemism: Endemic
Threats: Fire
Distribution: South
Restricted to Maunt Mulanje.

Clusia conferta Hutch.
Status: CR B1B2c
Endemism: Endemic
Threats: Fire
Distribution: South
Restricted to Maunt Mulanje.

Euphorbia lividiflora L.C.Leach
Status: VU D1D2
Distribution: South
Recorded from Mozambique, Zimbabwe and Tanzania.

Euphorbia milaniana L.C.Leach
Status: CR B1B2c
Endemism: Endemic
Threats: Fire
Distribution: South
Restricted to Maunt Mulanje.

Phyllanthus confusus Brenan
Status: VU B1B2cD2
Endemism: Endemic
Threats: Fire, alien plant infestation
Distribution: South
Restricted to Maunt Mulanje.

Phyllanthus nyikae* Radcl.-Sm.*Status:** VU D2

Endemism: Endemic

Distribution: North

Restricted to the Nyika Plateau. Grows at altitudes of 2,030–2,340 m. Found in montane grassland and on the grassy edges of forests.

FABACEAE

Aeschynomene tenuirama* Baker var. *hebecarpa* Verd.*Status:** VU D2

Endemism: Endemic

Distribution: North

Restricted to the Nyika Plateau. Known only from the type locality. Grows at an altitude of 2,400 m. Apparently lost collected in 1902.

Azelia quanzensis* Welw.*Status:** VU A1acd

Threats: Forestry exploitation

Distribution: South, Central, North

Found widely in small subpopulations. This species is over-exploited as a high quality timber.

Crotalaria pilasiflora* Baker*Status:** VU B1B2cD2

Endemism: Endemic

Threats: Habitat degradation?

Distribution: North

Restricted to the Nyika Plateau. Known from only three collections. Livingstonia is known to be an area where there is much habitat degradation.

Dalbergia melanaxylan* Guill. & Perr.*Status:** VU A1acdB1B2abce

Threats: Forestry exploitation, fire, browsing

Distribution: South, Central?

Found in dry woodland. However, because of over-harvesting, many individuals are developing a shrubby character. Widespread in southern and eastern Africa. Highly sought after by the wood carving industry.

Humularia descampsii* (De Wild. & T.Durand)*Duvign. var. *nyassica* Duvign.****Status:** VU B1B2bc

Endemism: Endemic?

Threats: Fire, agriculture

Distribution: Central, North

Possibly restricted to Malawi.

Indigafera hilaris* Eckl. & Zeyh. var. *microscypha* (Baker) J.B.GilletIndigofera nyikense* Baker**Status:** VU D2

Endemism: Endemic?

Distribution: North

Restricted to the Nyika Plateau. Only a single locality is known (known from two collections). No other information is available.

Pteracarpus angolensis* DC.*Status:** VU A1cd/A2cd

Threats: Forestry exploitation

Distribution: South, Central, North

Found in dry woodland. It is reported that most of the big trees come from Mozambique. Widespread in southern Africa and DRC. Used as a highly sought after timber.

FLACOURTIACEAE

Davyalis spinosissima* Gild*Status:** EX?

Endemism: Endemic

Distribution: South

Restricted to southern Malawi. Known from only one collection.

Rawsania burtt-davyi* (Edlin) F.White*Status:** VU B1B2cD2

Endemism: Endemic

Threats: Habitat degradation, forestry exploitation

Distribution: South

Restricted to Mount Mulanje. Felled as a timber tree.

GERANIACEAE

Geranium mlanjense* J.R.Laundon*Status:** VU B1B2cD2

Endemism: Endemic

Threats: Fire, alien plant infestation

Distribution: South

Restricted to Mount Mulanje.

GESNERIACEAE

Streptacarpus nimbicala* Hilliard & B.L.Burt*Status:** VU D2

Endemism: Endemic

Distribution: South

Restricted to Mount Mulanje.

GLEICHENIACEAE

Gleichenia elangata* Baker*Status:** EN A2bC1C2a

Threats: Fire

Distribution: North

Found in forest margins along streams. However, recent surveys could not find it there (probably a relict).

Produces underground rhizomes (forms a clonal population). Reproduction by spores takes very long; has a low spore viability.

HAMAMELIDACEAE

Trichocladus gaetzei* Engl.*Status:** VU B1B2bd

Distribution: North

IRIDACEAE

Gladialus bellus* C.H.Wright*Status:** VU B1B2cD2

Endemism: Endemic

Threats: Fire?

Distribution: South

Restricted to Mount Mulanje.

LAMIACEAE

Plectranthus crassus* N.E.Br.*Status:** CR B1B2c

Endemism: Endemic

Threats: Fire?

Distribution: South

Restricted to Mount Mulanje.

Plectranthus mandalensis* Baker*Status:** VU B1B2cD2

Endemism: Endemic

Threats: Fire?

Distribution: South

Restricted to Mount Mulanje.

Stachys didymantha* Brenan*Status:** VU B1B2cD2

Endemism: Endemic

Threats: Fire?

Distribution: South

Restricted to Mount Mulanje.

LOBELIACEAE

Cyphia brummittii* Thulin*Status:** CR B1B2c

Endemism: Endemic

Threats: Fire?

Distribution: South

Restricted to Mount Mulanje.

Cyphia decara* Thulin*Status:** VU B1B2cD2

Endemism: Endemic

Threats: Fire?

Distribution: South

Restricted to Mount Mulanje.

Lobelia blantlyrensis* E.Wimmer*Status:** VU D2

Endemism: Near-endemic

Distribution: South

LYCOPODIACEAE

Lycopodium phlegmaria* L.*Status:** VU A2bcdeB1B2abcde

Threats: Fire, habitat degradation, agriculture

Distribution: South

It is epiphytic, and is extremely conspicuous. Suitable habitat left is probably 5 km of riverine habitat. The habitat has been reduced. Also known from Zimbabwe, Asia and Tropical Africa.

MALVACEAE

Hibiscus burtt-davyi* Dunkley*Status:** VU B1B2c D2

Endemism: Near-endemic

Distribution: South

Also recorded from Mozambique and Zimbabwe.

MELASTOMACEAE

Dissotis lanata* A. & R.Fern.*Status:** EN B1B2c

Endemism: Endemic

Threats: Fire

Distribution: North

Endemic to Malawi.

MORACEAE

Darstenia schleibenni* Mildbr.*Status:** VU D2

Distribution: North

The species grows from an underground tuber reaching a height of almost 1 m. It is known from private land. Because the species may often be overlooked (it is small in size and seasonal), it could easily be a case of undercollection. Found in riverine forest.

Ficus attaniifolia* (Miq.) Miq. subsp. *ulugurensis* (Mildbr. & Burret) C.C.BergFicus modesta* White**Status:** EN C2a D

Threats: Alien plant infestation

Distribution: Central

Found in dry closed woodland. Recruitment occurs at remnant subpopulations; juveniles were found growing on trees. It is probable that other localities do not exist in Malawi. Essentially, the subpopulation in Malawi is an evolutionary 'dead end'. This taxon has a wide distribution range. Also recorded from Tanzania and Kenya.

Milicia excelsa* (Welw.) C.C.Berg*Status:** CR A1acdB1B2bce

Threats: Forestry exploitation

Distribution: South, Central, North

This tree can grow up to 20–50 m tall. It is a tropical African genus consisting of two species. It is commonly called 'eroco timber'. It is a highly desirable, high-value timber species. Only a few remnant patches remain, and there are certainly no viable subpopulations left in Malawi. Forest timber species, known mainly from miamba. Wide African distribution.

Morus mesozygia Stapf

Status: EN A2cd

Threats: Habitat degradation

Distribution: South, Central

This is the only African species in the genus. It grows to a tall tree of up to 40 m. It exists in small relict patches. Its habitat is evergreen forest in a riparian habitat. No other localities are known. The species is widespread in Africa.

ORCHIDACEAE

Aerangis distincta J.Stewart & la Croix

Status: EN A2cd

Endemism: Endemic

Threats: Forestry exploitation, habitat degradation

Distribution: South, Central, North

Epiphyte present in several localities throughout Malawi.

Aerangis splendida J.Stewart & la Croix

Status: EN A2cdB1B2bcd

Threats: Forestry exploitation, habitat degradation

Distribution: South

Epiphyte. Thyolo locality extirpated. Still safe at Mulunguzi River where it is rare.

Brownleea mulanjiensis H.P.Linder

Status: VU D2

Endemism: Endemic

Distribution: South

Restricted to Mount Mulanje.

Cynorkis anacamptoides Kraenzl. var. *ecalcarata* P.J.Cribb

Status: VU D2

Endemism: Endemic

Distribution: North

Endemic to the Nyika Plateau. It is associated with perennial dombos. The species was lost collected more than 30 years ago and is said to be an abnormal form.

Cynorkis brevicealcar P.J.Cribb

Status: VU D2

Endemism: Endemic

Distribution: South

Restricted to Mount Mulanje. Said to have a narrow distribution.

Habenaria livingstoniana la Croix & P.J.Cribb

Status: CR B1B2cdD2

Endemism: Endemic

Threats: Agriculture, habitat degradation

Distribution: North

Restricted to the Nyika Plateau. Known only from the type locality (two collections).

Habenaria petraea Renz & Grosvenor

Status: VU D2

Endemism: Near-endemic

Distribution: North

Appears to be widely distributed. It is found in grasslands which interface with Brachystegia woodland. It is known from a number of localities.

Habenaria pubidens P.J.Cribb

Status: VU D2

Endemism: Near-endemic

Distribution: North

The species forms colonies. It has a patchy distribution.

Habenaria riparia Renz & Grosvenor

Status: CR B1B2c

Endemism: Endemic

Threats: Habitat degradation

Distribution: North

Known only from the Nyika Plateau. Several collections from the type locality. Possibly affected by tourist or visitor impacts.

Polystachya johnstonii Rolfe

Status: VU B1B2cdD2

Endemism: Endemic

Threats: Fire

Distribution: South

Possibly restricted to Mount Mulanje. Found on most hills and mountains to the south of Zombo, but grows on Xerophyta, which is cut for pot scourers even in protected areas. Polystachya johnstonii Rolfe var. johnstonii la Croix & P.J.Cribb is sometimes used as a synonym. The other variety of this species, P. johnstonii var. roseopurpurea, is also at risk, but there is no information available for this variety.

Polystachya kaluluensis P.J.Cribb & la Croix

Status: EX?

Endemism: Endemic

Threats: Deforestation, agriculture, habitat degradation

Distribution: South

This species may already be extinct since virtually all the trees from its forest habitat have been felled and much of the land is under agriculture.

Polystachya minima Rendle

Status: EN A2cd

Endemism: Endemic

Threats: Deforestation, urban expansion, habitat degradation

Distribution: South

Endemic to southern Malawi. Known only from woodland within an area about 40 km south of Blontyre. This species used to be very common where it grew.

Polystachya mzuensis P.J.Cribb & la Croix

Status: VU A2c

Threats: Urban expansion, deforestation?

Distribution: North

Known only from two or three sites near Mzuzu in woodland.

Polystachya purpleobracteata P.J.Cribb & la Croix

Status: CR B1B2c

Endemism: Endemic

Threats: Fire

Distribution: South

Known only from Mount Mulanje. This is a tiny plant and is probably overlooked.

Satyrium afromontanum la Croix & P.J.Cribb

Status: VU D2

Endemism: Endemic

Distribution: South

Known only from Mount Mulanje.

Stolzia compacta P.J.Cribb subsp. *compacta*

Status: CR B1B2c

Endemism: Endemic

Distribution: North

Known only from the Nyika Plateau. Locally widespread. Known only from the type collection. Last collected in 1968?

Stolzia nyassana Schltr.

Status: EN B1B2c

Distribution: North

Known only from a few tree habitats.

Taeniophyllum coxii (Summerh.) Summerh.

Status: EX?

Threats: Deforestation, urban expansion

Distribution: North

Known only from one small site which has probably been decimated due to tree felling. Also present but rare in Ghana, DRC and Tanzania.

Tridactyle citrina P.J.Cribb

Status: VU B1B2D

Threats: Deforestation

Distribution: North

Known only from a few woodland areas. At risk due to tree felling. Also known from a few areas in Zambia and Tanzania.

Zeuxine ballii P.J.Cribb

Status: VU B1B2D2

Threats: Habitat degradation, deforestation

Distribution: North

Known only from one locality. The habitat is threatened. Widely distributed outside Malawi.

POACEAE

Alloochaete oreogena Launert

Status: VU D2

Endemism: Endemic

Distribution: South

Known only from Mount Mulanje.

Eragrostis sylviae Cope

Status: VU D2

Endemism: Endemic

Distribution: South

Known only from Mount Mulanje.

PROTEACEAE

Protea caffra Meisn. subsp. *nyasae* (Rendle)

Chisumpa & Brummitt

Status: VU B1B2cdD2

Endemism: Endemic

Threats: Fire

Distribution: South

Restricted to Mount Mulanje.

PTERIDACEAE

Adiantum confine Fee

Status: VU A2c

Threats: Agriculture, habitat degradation

Distribution: South

This is the only Flora zambesiaca record for this species. There is widespread habitat destruction affecting this species. Wide African distribution, including the Comores.

Adiantum reniforme L.

Status: VU D1D2

Distribution: North

Four localities in Africa. Collected along half a kilometre of river frontage. The species needs shade on humid ledges. It is not widespread in Africa (recorded from Kenya, Senegal, Gambia, Reunion, Canary Islands, and so forth) as subpopulations are isolated.

Pellaea angulosa (Bory ex Willd.) Baker

Status: VU A2bcdB1B2abcde

Distribution: South

Also recorded in Reunion, Mascarenes, Mozambique, Zimbabwe, Tanzania and so forth.

RESTIONACEAE

Restio milanjanus H.P.Linder

Status: VU B1B2cdD2

Endemism: Endemic

Threats: Fire

Distribution: South

Restricted to Mount Mulanje.

ROSACEAE

Prunus africana (Hook.f.) Kalkm.

Status: VU A1cd

Threats: Harvesting

Distribution: South, Central, North

Found in dry woodland. Found at higher elevations in small fragmented subpopulations. Known from Angola, Mozambique, Zimbabwe, Zambia, Central Africa, East Africa, DRC and so forth. Used for medicinal purposes.

RUBIACEAE

Burttidavya nyasica Hoyle

Status: EN B1B2bce

Threats: Forestry exploitation, habitat degradation

Distribution: South

In Malawi it has always been known from only one locality. Also recorded from Tonzonio and Mozambique.

Coffea mufindiensis Hutch. ex Bridson subsp.

lundaziensis Bridson

Status: VU D1D2

Distribution: South, North

This is an afro montane species recorded at an altitude of 2,000 m. Also known from the Zombio-Nyika Plateau.

Morinda asteroscepa K.Schum.

Status: VU B1B2bD2

Endemism: Near-endemic

Distribution: Central, North

Found in moist forests.

Pavetta comostyla S.Moore subsp. *nyassica*

(Bremek.) Bridson

Status: VU B1B2b

Endemism: Near-endemic

Distribution: North

Found in montane forest.

Pavetta kymbilensis Bremek. var. *iringensis*

(Bremek.) Bridson

Status: VU B1B2b

Endemism: Near-endemic

Distribution: North

Found in montane forest.

Pavetta subumbellata Bremek. var. *subcoriacea*

Bridson

Status: VU B1B2b

Endemism: Near-endemic

Distribution: North

Found in montane forest.

Pyrostria chapmanii Bridson subsp. *chapmanii*

Status: VU B1B2cD2

Endemism: Endemic

Threats: Fire

Distribution: South

Known only from Mount Mulanje.

Rytigynia adenodonta (K.Schum.) Robyns var.

adenodonta

Status: VU D2

Distribution: North

Found in montane forests. Taxonomy is dubious. Also recorded from Zombio and Tonzonio.

Rytigynia adenodonta (K.Schum.) Robyns var.

reticulata (Robyns) Verdc.

Status: VU B1B2bC2a

Distribution: South, Central, North

Found in moist forests. More than 1,000 individuals per subpopulation. The species appears to be common as indicated by the number of herbarium collections. Also known from Mozambique, Zombio, Tonzonio and possibly Zimbabwe.

Rytigynia bugoyensis (K.Krause) Verdc. subsp.

glabriflora Verdc.

Status: VU B1B2b

Endemism: Near-endemic

Distribution: North

Found in montane forest. It is very restricted although it is known from several collections from different localities.

Rytigynia pawekiae Verdc.

Status: VU D2

Endemism: Endemic

Threats: Fire, habitat degradation

Distribution: North

Known only from the type collection in submontane grassland.

Sericanthe odoratissima (K.Krause) Robbrecht var.

ulugurensis Robbrecht

Status: VU B1B2b

Distribution: North

Found in montane forest. The taxonomic status of this species may change.

Tricalysia coriacea (Benth.) Hiern subsp.

angustifolia (Garcia) Robbrecht

Status: VU D2

Distribution: South

Found in montane forest. Known from the country

border. This variety is uncommon in Malawi. Also known from Mozambique, Zimbabwe and Zombio.

RUTACEAE

Vepris elegantissima F.White & Pannell

Status: CR B1B2c

Endemism: Endemic

Threats: Habitat degradation

Distribution: South

Restricted to Mount Mulanje.

Zanthoxylum deremense (Engl.) Kokwaro

Status: VU B1B2b

Distribution: North

Found in montane forest. It is very restricted, although found elsewhere.

SAPINDACEAE

Deinbollia nyasica Exell

Status: EX?

Endemism: Endemic

Threats: Habitat degradation, urban expansion

Distribution: South

Found in moist forest.

STERCULIACEAE

Cola mossambicensis Wild

Status: VU B1B2c

Distribution: South

Found in lowland forest. Recorded from Mozambique and Zimbabwe.

THEACEAE

Ternstroemia polypetala Melch.

Status: VU B1B2d

Distribution: North

Found in forests. Also recorded from the field as Cameroon. Also known from Tonzonio.

VELLOZIACEAE

Xerophyta splendens (Rendle) N.L.Menezes

Status: VU B1B2cD2

Endemism: Endemic

Threats: Fire

Distribution: South

Restricted to Mount Mulanje.

ZAMIACEAE

Encephalartos gratus Prain

Status: CR B1B2cC2b

Threats: Fire, browsing

Distribution: South

Found in forest margins. Affected by the activities of blue monkeys.

Encephalartos sp. Greenway 6283

Status: EX?

Endemism: Endemic

Distribution: South

Collected in miombo woodland in the vicinity of Blontyre. Known only from a single herbarium collection (in PRE). This collection represents a 'good' species. Collected in 1941. The entire vicinity of Blontyre has undergone extensive land and urban transformation, and it is almost certain that the species no longer exists.



Mulanje cedar forest in the upper Likabula Valley. (Photo: J. Burrows)

LOWER RISK

ALOACEAE

Aloe duckeri Christian

Status: LR-lc

Distribution: South, Central, North

The species is common and widespread, and in abundance.

Aloe zebrina Baker

Status: LR-lc

Threats: Fire

Distribution: South, Central

ANACARDIACEAE

Ozoroa reticulata (Bakerf.) R. & A.Fern. var. *nyasica* R. & A.Fern.

Status: LR-lc

Distribution: South

Known from both miombo and mopone woodlands. It is extremely widespread.

Rhus acuminatissima R. & A.Fern.

Status: LR-lc

Endemism: Endemic

Threats: Fire

Distribution: South

Restricted to southern Malawi.

ANTHERICACEAE

Chlorophytum nyasae (Rendle) Kativu

Status: LR-lc

Distribution: South, North

Alternative genus name is Anthericum.

ASCLEPIADACEAE

Ceropegia paricyma N.E.Br.

Status: LR-nt

Distribution: South, Central, North

Widespread throughout Malawi, but with a notoriously scattered distribution. Also recorded from Mozambique, Zimbabwe, Zambia, Tanzania, Coprivu oreo and other areas.

ASPLENIACEAE

Asplenium medsei Pichi Serm.

Status: LR-lc

Endemism: Endemic?

Distribution: North

Known only from the Nyika Plateau from a single, deep, very inaccessible forest (2,200 m). However, it may possibly occur on the Zombio-Nyika.

Asplenium torrei Schelpe

Status: LR-nt

Threats: Habitat degradation, deforestation

Distribution: South

Collected at 1,410 m. Known only from Malawi, Mozambique and Zimbabwe.

Asplenium unilaterale Lam.

Status: LR-nt

Distribution: South, Central

Only three localities in the Flora zambesiaca region, two of which are in Malawi. Recorded in Zimbabwe, Madagascar, Mauritius, Mascarenes and widespread in Tropical Africa.

ASTERACEAE

Brachythrix malawiensis (Wild & G.V.Pope)

G.V.Pope

Brachythrix brevipapposa subsp. *malawiensis* Wild & G.V.Pope

Status: LR-lc

Endemism: Endemic

Distribution: North

Grows in submontane grassland and woodland at an altitude of 2,133 m. Known from only two collections from two localities; endemic to the Nyika Plateau.

Helichrysium syncephalum Baker

Status: LR-nt

Endemism: Endemic

Distribution: South

Restricted to Mount Mulanje.

BALSAMINACEAE

Impatiens schulziana Launert

Status: LR-lc

Endemism: Endemic

Distribution: South, North

On borders of montane forest. It is associated with waterfalls (2,200–2,600 m). It is apparently widely distributed in the Nyika National Park. The taxonomy of this species is also very uncertain. Widely differing accounts state that it is either confined to the Nyika Plateau or that it is also found on Mount Mulanje.

BLECHNACEAE

Blechnum ivohimbense C.Chr.

Status: LR-lc

Distribution: South

Wide distribution also recorded from Mozambique, Zimbabwe, Madagascar, Kenya, Tanzania and others.

CELASTRACEAE

Maytenus acuminata (L.f.) Loes. var. *uva-ursi*

Brenan

Status: LR-nt

Endemism: Endemic

Distribution: South

Restricted to Mount Mulanje.

COMBRETACEAE

Pteleopsis myrtifolia (Laws.) Engl. & Diels

Status: LR-lc

Threats: Harvesting

Distribution: South, Central, North

Occurs in miombo. It is harvested for fuelwood and the timber is used for poles.

CYPERACEAE

Carex brassii Nelmes

Status: LR-lc

Endemism: Endemic?

Distribution: South, North

A single specimen from Rumphi District (Powe 13856) appears to be *C. brassii*, but the material is poor.

Recently collected on the Nyika Plateau. Possibly found in Tanzania.

ERICACEAE

Erica milaniana Bolus

Status: LR-nt

Endemism: Endemic

Distribution: South

Restricted to Mount Mulanje.

EUPHORBIACEAE

Croton megalobotrys Mull.Arg.

Status: LR-lc

Distribution: South

Common in large numbers along streams and rivers.

Erythrococca trichogyne (Mull.Arg.) Prain var.

psilogyne Radcl.-Sm.

Status: LR-lc

Endemism: Near-endemic

Distribution: North

The species appears to be extremely widespread. There is another unspecified locality on the Malawi-Nyika.

Euphorbia whyteana Baker f.

Status: LR-nt

Endemism: Endemic

Threats: Fire

Distribution: South

Restricted to Mount Mulanje. Represented by many herbarium specimens, indicating a level of abundance.

FABACEAE

Tephrosia whyteana Baker subsp. *whyteana*

Status: LR-nt

Endemism: Endemic

Threats: Fire

Distribution: South

Restricted to Mount Mulanje.

GESNERIACEAE

Streptocarpus dolichanthos Hilliard & B.L.Burt

Status: LR-nt

Endemism: Endemic

Distribution: South

Restricted to Mount Mulanje.

Streptocarpus hirtinervis C.B.Clarke

Status: LR-lc

Endemism: Endemic

Threats: Fire

Distribution: South

Restricted to southern Malawi.

Streptocarpus leptopus Hilliard & B.L.Burt

Status: LR-nt

Endemism: Near-endemic

Distribution: South

Streptocarpus milanianus Hilliard & B.L.Burt

Status: LR-nt

Endemism: Endemic

Distribution: South

Restricted to Mount Mulanje.

GRAMMITIDACEAE

Lellingeria oosora (Baker) A.R.Sm. & R.C.Moran

Status: LR-lc

Distribution: South

Very small and probably overlooked. Found at high altitudes (about 2,000 m). Known from Zambia and Tropical Africa.

LAMIACEAE

Plectranthus acaulis Brummitt & Seyani**Status:** LR-lc

Endemism: Near-endemic

Threats: Habitat degradation?

Distribution: North

Known from only a single locality in Zombio (Nyiko Plateau). Initially considered to be categorised as Vulnerable based on the number of herbarium specimens. However, the species is probably continuously distributed.

Plectranthus zebraurum Brummitt & Seyani**Status:** LR-lc

Endemism: Endemic

Distribution: North

Possibly endemic to the Nyiko Plateau. The species appears to be common on the Nyiko Plateau and it possibly extends into Zombio.

LOMARIOPSIDACEAE

Elaphoglossum mildbraedii Hieron.**Status:** LR-nt

Distribution: South

1,765–2,075 m altitude. Probably very easily overlooked. Also known from East Africa.

MELASTOMATACEAE

Dissotis johnstoniana Baker f. var. *strigosa* Brenan**Status:** LR-nt

Endemism: Endemic

Distribution: South

Restricted to Mount Mulanje.

MYRSINACEAE

Anagallis oligantha P.Taylor**Status:** LR-nt

Endemism: Endemic

Distribution: South

Restricted to Mount Mulanje.

OPHIOGLOSSACEAE

Ophioglossum thomasi Clausen**Status:** LR-lc

Distribution: South, North

Small species and often overlooked. Known mainly from dombos at an altitude greater than 2,000 m. Vost habitat of this species on the Nyiko Plateau. Extremely widespread. Known only from two localities in Malawi. Known also from Tanzania, Kenya and possibly occurs elsewhere.

ORCHIDACEAE

Cynorkis buchananii Rolfe**Status:** LR-nt

Endemism: Endemic

Distribution: South

Restricted to southern Malawi. Several sites on Zombo Plateau and Mount Mulanje.

Habenaria nyikense G.Will.**Status:** LR-nt

Endemism: Endemic

Distribution: North

Known as an endemic of the northern plateaux of Malawi. The species has a wide altitudinal range of almost 600 m.

Herschelianthe praecox (H.P.Linder) H.P.Linder**Status:** LR-lc

Endemism: Endemic

Distribution: North

Known only from the Nyiko Plateau. It grows in short well drained grassland above 2,000 m.

Polystachya songaniensis G.Will.**Status:** LR-lc

Endemism: Endemic

Threats: Habitat degradation, deforestation?

Distribution: South

Known from only a few localities on mountains in the Southern Province. Found on rocks and remains of sedge plants, so not at risk of tree felling or cultivation. Common on Mount Zombo.

OXALIDACEAE

Oxalis chapmaniae Exell**Status:** LR-lc

Endemism: Endemic

Distribution: North

Known only from the Nyiko Plateau. Grows at an altitude of 2,130–2,440 m in submontane grassland. This species is fairly common on the Nyiko Plateau.

POACEAE

Alloeochoete geniculata Kabuye**Status:** LR-nt

Endemism: Endemic

Distribution: South

Known only from Mount Mulanje.

Alloeochoete gracillima Kabuye**Status:** LR-nt

Endemism: Endemic

Distribution: South

Known only from Mount Mulanje.

Digitaria trinervis Van der Veken**Status:** LR-nt

Endemism: Endemic

Distribution: South

Known only from Mount Mulanje.

Eragrostis fastigiata Cope**Status:** LR-nt

Endemism: Endemic

Distribution: South

Known only from Mount Mulanje.

Panicum nymphoides Renvoize**Status:** LR-nt

Endemism: Endemic

Distribution: South

Known only from Mount Mulanje.

Setaria grandis Stapf**Status:** LR-lc

Endemism: Endemic

Distribution: North

Known only from the Nyiko Plateau. This species is locally abundant in that it has a very restricted distribution but occurs in extremely high numbers, almost to the point of being weedy.

POLYGALACEAE

Polygala nyikensis Exell**Status:** LR-lc

Endemism: Near-endemic

Distribution: North

This species has been collected from several unspecified localities. Grows in submontane grassland up to 2,300 m. Early herbarium collections represent individuals older than a year, attributed to the effect of fire.

PROTEACEAE

Protea caffra Meisn. subsp. *mafinensis* Chisumpa & Brummitt**Status:** LR-lc

Endemism: Endemic

Distribution: North

Endemic to Malawi. This species appears to be common on the Nyiko Plateau.

PTERIDACEAE

Coniogramme africana Hieron.**Status:** LR-lc

Distribution: North

Found in deep forests. It is rare wherever it occurs. Also known from East Africa.

RUBIACEAE

Ixora scheffleri K.Schum. & K.Krause subsp. *scheffleri***Status:** LR-nt

Endemism: Near-endemic?

Threats: Harvesting

Distribution: South, Central, North

Found in submontane forest where it is extremely widespread. Also recorded from Tanzania and Mozambique. Often used as a fuelwood.

Psychotria zombamontana (Kuntze) Petit**Status:** LR-nt

Threats: Harvesting

Distribution: South, Central

Found in montane forests where it is widely distributed. Widely distributed outside Malawi. Reported to be very common. Often used as a fuelwood.

SCROPHULARIACEAE

Buchnera crassifolia Engl.**Status:** LR-lc

Endemism: Endemic

Distribution: North

It is known only from submontane grasslands up to 2,400 m. The holotype was destroyed in Berlin.

Selago blantyreensis Rolfe**Status:** LR-lc

Endemism: Endemic

Distribution: South

Confined to southern Malawi. Found amongst rocks in open grassland and woodland. Found along roadsides and firebreaks.

Selago thyrsoidea Baker var. *thyrsoidea***Status:** LR-nt

Endemism: Endemic

Threats: Habitat degradation

Distribution: North

Known only from the Nyiko Plateau. Possibly affected by tourist or visitor impacts.



Disa zombica, a species possibly used for *chikanda*.

(Photo: G. Williamson)

ASPLENIACEAE

Asplenium uhlighii Hieron.

Status: DD

Initially thought to be a depauperate form of *A. aethiopicum*. Associated with mountain peaks.

ASTERACEAE

Helichrysum patulifolium Baker

Helichrysum flammeiceps Brenan

Status: DD

Endemism: Endemic?

Threats: Fire

Distribution: North

Possibly endemic to Malawi. Grows in *Brachystegia* woodland.

Senecio auriculatissima Britten

Status: DD

Endemism: Near-endemic

Threats: Fire

Distribution: South

The identity of this species may be questionable.

Senecio milanjanus S.Moore

Status: DD

Endemism: Near-endemic

Distribution: South

The identity of this species may be questionable.

CYPERACEAE

Alinula malawica (J.Raynal) Goetgh. & Vorster

Status: DD

Endemism: Near-endemic

Distribution: South

Known only from one record in Malawi, and from one other record in Zambia.

Fuirena nyasensis Nelmes

Status: DD

Endemism: Endemic

Distribution: South, Central, North

Restricted to Malawi.

Pycreus acaulis Nelmes

Status: DD

Endemism: Endemic

Distribution: South, Central, North

Restricted to Nyika Plateau.

EUPHORBIACEAE

Euphorbia ampliphylla Pax

Status: DD

Threats: Deforestation

Distribution: North

Known from Nyika Plateau and Motipo Forest. Recorded from Tanzania, Uganda, Kenya, Ethiopia and so forth. Also referred to as *E. obovalifolia*.

Euphorbia isacantha Pax

Status: DD

Distribution: North

Known only from Korongo District. It is believed to be rare in Malawi based on the low numbers of herbarium specimens.

Euphorbia richardsiae L.C.Leach subsp. robusta L.C.Leach

Status: DD

Endemism: Endemic

Distribution: North

Restricted to Malawi. It is believed to be rare based on the low number of herbarium specimens. Herbarium specimens of both subspecies (*S. richardsiae* subsp. *richardsiae* and *S. richardsiae* subsp. *robusta*) are mainly from Mzimba on granite outcrops.

Monadenium parviflorum N.E.Br.

Status: DD

Distribution: South, Central, North

Restricted mainly to the Nyika Plateau, although it is widespread throughout Malawi. Also known from Tanzania and Zambia. A common synonym for this species is *M. depauperatum*.

FABACEAE

Lotus mlanjeanus J.B.Gillett

Status: DD

Endemism: Endemic?

Distribution: South, Central, North

Possibly restricted to Malawi.

Rhynchosia clavivora S.Moore var. fulvida Meikle

Status: DD

Endemism: Endemic?

Distribution: South, Central, North

Possibly restricted to Malawi.

FLACOURTIACEAE

Rawsonia reticulata Gilg

Status: DD

Distribution: North

Unspecified locality around 'Lake Nyasa' from an early herbarium specimen.

ILLECEBRACEAE

Corrigiola drymarioides Baker f.

Status: DD

Endemism: Near-endemic

Distribution: South

LAMIACEAE

Plectranthus dissectus Brenan

Status: DD

Endemism: Endemic

Threats: Fire

Distribution: South

Restricted to southern Malawi.

Plectranthus elegans Britten

Status: DD

Endemism: Endemic

Threats: Fire

Distribution: South

Restricted to southern Malawi.

Plectranthus malawiensis Mathew

Status: DD

Endemism: Endemic

Distribution: North

Known from only two localities.

Plectranthus zombensis Baker

Status: DD

Endemism: Endemic

Threats: Fire

Distribution: South

Restricted to southern Malawi.

LOMARIOPSIDACEAE

Elaphoglossum deckenii (Kuhn) C.Ch.

Status: DD

Distribution: South

Rarest species of the genus. Found in wet forests. There may be more localities. Also known from East Africa.

Lomariopsis warneckeii (Hieron.) Alston

Status: DD

Threats: Fire, habitat degradation

Distribution: South, North

Very rare, never widespread. Widely creeping rhizome. Also known from Mozambique, Zimbabwe, Tanzania, Cameroon and so forth.

LYTHRACEAE

Rotala juniperina Fern.

Status: DD

Endemism: Endemic?

Distribution: South

Possibly restricted to Mount Mulanje.

MELASTOMATACEAE

Dissotis johnstoniana Baker f. subsp. johnstoniana

Status: DD

Endemism: Near-endemic

Distribution: South

MORACEAE

Ficus scassellatii Pamp.

Status: DD

Threats: Habitat destruction, forestry exploitation

Distribution: South, Central, North

This species grows in mid-altitude semi-evergreen forest (1,900–1,950 m). It is a tall strongler fig, recorded as growing to heights of 50 m. Also recorded from Tanzania, Kenya, Uganda and DRC.

ORCHIDACEAE

Anagraecum stella-africae P.J.Cribb

Status: DD

Threats: Forestry exploitation, habitat degradation

Distribution: South, North

Level of endemism uncertain. Two known sites in the north and a single collection in the south.

Bolusiella maudiae (Bolos) Schltr.

Status: DD

Threats: Forestry exploitation, habitat degradation

Distribution: South

Widespread in woodland and widely represented outside Malawi.

Cardiochilus williamsonii P.J.Cribb

Status: DD

Endemism: Near-endemic

Distribution: North

Known only from a single oreo on Nyika Plateau.

Cynorkis symoensii Geernick & Tournay

Status: DD

Distribution: North

Known from a small oreo. Also recorded from Tanzania and Rwanda.

Disa fragrans Schltr. subsp. fragrans

Status: DD

Distribution: South

Known from several countries. Collected only once or twice in Malawi.

Disa nyikensis H.P.Linder

Status: DD

Distribution: North

Also recorded from Zambia and Tanzania.

Disperis breviloba Verdc.

Status: DD

Distribution: North

Collected only once on Nyika Plateau.

Eggelingia clavata Summerh.

Status: DD

Distribution: South

Has a wide African distribution, especially West Africa.

Eulophia monticola Rolfe

Status: DD

Endemism: Near-endemic

Distribution: South

Taxonomically difficult to separate *Eulophia monticola* from *E. inyangensis* Summerh. Previously, *E. monticola* had been considered endemic to Mount Mulanje.

Habenaria disselloides Schltr.

Status: DD

Endemism: Near-endemic

Distribution: North

Known from only a few localities on the Nyika Plateau.

Habenaria hirsutitrunci G.Will.

Status: DD

Endemism: Near-endemic

Distribution: North

Also found on Zambia-Nyika. Occurs in several scattered sites on Malawi-Nyika. Possibly known from other sites further afield.

Habenaria pubipetala Summerh.

Status: DD

Endemism: Endemic

Threats: Forestry exploitation, agriculture

Distribution: South, Central, North?

Endemic to Malawi. Only one old record from the North, most of the localities are from southern and central Malawi. All the localities are threatened.

Microcoelia corallina Summerh.

Status: DD

Distribution: South, North?

Known only from the southern part of Malawi. Possibly occurs in northern Malawi. Also known from Kenya and Tanzania.

Microcoelia megalorrhiza (Rchb.f.) Summerh.

Status: DD

Threats: Habitat degradation

Distribution: South

Known only from two localities in the South. It is reported that the species is poorly protected. This species is known to be rare.

Microcoelia ornithocephala P.J.Cribb

Status: DD

Endemism: Endemic

Threats: Habitat degradation

Distribution: South

Restricted to Malawi. Known only from two localities in the South.

Oberonia disticha Lindl.

Status: DD

Distribution: South

Known only from two sites in Southern Province (and only collected once at one of these) but fairly widespread elsewhere in Africa.

Platylepis glandulosa (Lindl) Rchb.f

Status: DD

Distribution: South, North

Known only from two small areas in Malawi but widespread elsewhere in Africa.

Polystachya calluniflora Kraenzl. var. *hologlossa* P.J.Cribb & la Croix

Status: DD

Distribution: North

Found in small areas at risk of tree felling.

Polystachya goetzeana Kraenzl.

Status: DD

Occasional in forest patches.

Polystachya holmesiana P.J.Cribb

Status: DD

Threats: Deforestation, habitat degradation

Distribution: North

Found inside a small area within Nyika National Park, as well as at a locality on the Park's periphery which is under much threat from tree felling.

Polystachya lawrenceana Kraenzl.

Status: DD

Endemism: Endemic

Distribution: South

Endemic to Malawi. Grows on rocks so not at risk from tree felling.

Polystachya mafingensis P.J.Cribb

Status: DD

Endemism: Near-endemic

Threats: Deforestation

Distribution: North

Restricted to the Mafinga Mountain.

Satyrium ecalcaratum Schltr.

Status: DD

Distribution: South

In Malawi it is known only from a few herbarium collections. Known from other African countries.

Solenangis conica (Schltr.) L.Jonsson

Status: DD

Distribution: Central

Known only from a small locality. Also in Mozambique, Zimbabwe and Tanzania.

Stolzia williamsonii P.J.Cribb

Status: DD

Distribution: North

Associated with forests of Nyika Plateau.

Tridactyle verrucosa P.J.Cribb

Status: DD

Distribution: South

Epiphytic on rocks and windswept trees.

Tridactyle virginea P.J.Cribb & la Croix

Status: DD

Distribution: North

POLYPODIACEAE

Platyserium elephantotis Schweinf.

Status: DD

Widespread throughout Africa in countries such as Sudan, Mozambique, and Zambia.

PROTEACEAE

Faurea racemosa Farmar

Status: DD

Endemism: Near-endemic

Distribution: South

PTERIDACEAE

Anogramma leptophylla (L.) Link

Status: DD

Distribution: North

There is only one known recent collection in Malawi; the species is probably extremely widespread. It should probably be removed from the RDL.

RUBIACEAE

Coffea mufindiensis Hutch. ex Bridson subsp. *australis* Bridson

Status: DD

Distribution: South, Central, North

The species appears to be extremely common as there are many collections for it. No other information is available. Also recorded from Mozambique and Zimbabwe.

Coffea sp. Brummitt 8936

Status: DD

Endemism: Endemic

Distribution: South

Grows in thicket. Known only from the type locality. Type specimen collected in 1970.

Oxyanthus goetzei K.Schum. var. *A* Bridson

Status: DD

Endemism: Endemic

Distribution: South, Central

Restricted to Malawi. Known from a number of specimens (Bridson 662 (K; MAL) 1991; Patel & Tawakali 999 (K; MAL) 1982). In undergrowth of evergreen montane forest, with *Newtonia*, *Garcinia*, etc. or in submontane forest at altitude 1,400–1,500 m.

SANTALACEAE

Thesium whyteanum Rendle

Status: DD

Endemism: Near-endemic

Distribution: South

SAPOTACEAE

Synsepalum muelleri (Kupicha) T.D.Penn.

Status: DD

Endemism: Near-endemic

Distribution: South

SCROPHULARIACEAE

Selago whyteana Rolfe

Status: DD

Endemism: Endemic

Distribution: South

Restricted to Mount Mulanje. Known only from the western side of the massif. Most specimens of this species are from roadsides and other bare areas. Often bauxite is mentioned as a substrate.

THYMELAEACEAE

Gnidia chapmanii Peterson

Status: DD

Endemism: Near-endemic

Distribution: South

VITTARIACEAE

Antrophyum mannianum Hook.

Status: DD

Distribution: South

There are only two records for it in the Flora zambesiaca area. It was recently collected on Mount Mulanje.

XYRIDACEAE

Xyris makuensis N.E.Br.

Status: DD

Endemism: Near-endemic

Distribution: South

Also known from Mozambique and possibly occurs in Tanzania.

Mozambique



Samira Izidine^{*} & Salomão O. Bandeira[†]

Introduction

Mozambique is located on the southeast coast of southern Africa (between 10°27'S and 26°52'S, and 30°52'E, 30°12'E and 41°51'E). The country occupies an area of approximately 800,000 km². It shares common borders with Tanzania in the north, Malawi, Zambia, and Zimbabwe in the west, and South Africa in the south. The Indian Ocean coastline of Mozambique is over 2,700 km in length.

The flora of Mozambique is characterised by miombo and mopane woodlands, grasslands, mangroves, and coastal mosaics (Wild & Barbosa 1967, White 1983). With 5,692 species of higher plants currently recorded for Mozambique, it is believed that some of these species are under pressure from human activity and natural causes. At total of 2,676 km² lies within protected areas, representing 11% of the country (Bandeira *et al.* 1994).

Two main centres of endemism occur in Mozambique: Maputaland in the south—which includes areas in South Africa and Swaziland—and Chimanimani that is shared between Zimbabwe and central Mozambique (Hatton & Mungambe 1998). Consequently, some plant species that occur in these centres of endemism and are listed as endemic, could well be near-endemic (and vice versa). Endemic

species whose distribution ranges are dubious include *Hexalobus mossambicensis* and *Xylopia torreii*; examples of those sceptically considered near-endemic include *Pseudosbeckia swynnertonii* and *Anthospermum ammannioides*. Most of the botanical inventories undertaken in Mozambique have been conducted mainly in the south of the country; the centre and north have been less well documented.

High population densities in towns, however, in conjunction with poverty-stricken conditions, stimulate forest and savanna depletion for fuelwood requirements; this has been the major cause of forest and savanna degradation in Mozambique. Deforestation rates reach up to 147,077 ha per year. Mangroves, one of main vegetation types in coastal Mozambique, are being subjected to deforestation at a rate of 1,821 ha per year (Barbosa *et al.* 2001); mangrove degradation is particularly high in the rapidly expanding cities of Maputo and Beira. Other causes for the loss of species are traditional agricultural practices, monoculture systems, and unsustainable development.

A Red Data List for Mozambique is therefore a necessity to identify species at risk of extinction, and can assist in defining priorities, strategies, and actions towards their conservation.

Table 1. Number of taxa in each RDL category in Mozambique.

RDL status	Number of taxa
Extinct (EX)	1
Critically Endangered (CR)	6
Endangered (EN)	6
Vulnerable (VU)	109
Lower-Risk near threatened (LR-nt)	16
Lower-Risk least concern (LR-lc)	23
Data Deficient (DD)	139
Total	300

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Capital: Maputo, largest city and port

Area: 801,590 km²

Languages: Portuguese (official), Macua, Ndau, Tsonga, Maconde, Swahili

Currency: Meticals (MT)

Total plant species: 5,692

Total plant endemics: 177

Total RDL plants: 300

Focal RDL institutions: LMA, LMU

Number of Protected Areas: four National Parks, five Game Reserves, 13 Coutadas ("Official Hunting Areas"), one Transfrontier Park (Mozambique–South Africa–Zimbabwe), and several other proposed protected areas (including Transfrontier Parks)

Population: 17,299,000 **Growth Rate:** 1.9% **Density:** 21.2 people/km²

Phytogeography: Predominantly Zambezan, with Afromontane elements at higher altitudes. There is a broad belt of Zanzibar–Inhambane Regional Mosaic along the entire coastline and interior river valleys in the north except for a small area of Tonga–Pondoland Regional Mosaic in the extreme south.

Flora: Mainly miombo woodland, with mopane woodland in the Zambezi and Limpopo Valleys. Montane forests and grasslands found at higher elevations. Mosaic of coastal woodlands, as well as forest/mangrove patches.

Sources: Anonymous 2000, Bandeira, Hatton, Munisse & Izidine 1994, Stuart & Adams 1990, White 1983

Table 2. Families containing the highest numbers of RDL species.

Family	Number of species
Rubiaceae	26
Fabaceae	20
Euphorbiaceae	15
Zamiaceae	13

Table 3. Endemism on the RDL for Mozambique.

Endemism	Number of taxa
Confirmed endemic	166
Suspected endemic	11
Confirmed near-endemic	60
Suspected near-endemic	17
Total	254

Methods

Information Synthesis

During the first phase of RDL compilation, information regarding threatened plant species or those potentially at risk of extinction was synthesised. Data were gleaned from lists by Bandeira *et al.* (1994), Van Wyk (1996), Hatton & Munguambe (1998), Oldfield *et al.* (1998), and Walter & Gillett (1998). These lists tended to concentrate on endemic, medicinal, and woody species.

After the compilation of the draft list, a Red Data List workshop was held in Maputo from 23 to 27 October 2000. Participants were trained in the use of the IUCN criteria and categories (IUCN 1994). *Flora de Moçambique* and *Flora Zambeziaca* were used to refine the preliminary list of species that merited Red List status. Additional information on some of the better known plant species from southern Mozambique was obtained from field observations by botanists. Herbarium specimen information from LMA and LMU was used to identify additional species localities, but was subsequently found to be of extremely limited value. Vegetation maps were used to determine the distribution of habitats in which the Red Listed species occur and were also used to estimate threats.

We attempted to estimate distribution ranges (*Extent of Occurrence* and *Area of Occupancy*) but data were so unreliable (taxonomically), sparse, and outdated, and revealed so little about the threats in the habitats of many species, that it became extremely difficult to make assumptions and inferences.

Red List evaluations were done for species falling into the following categories:

- Species endemic or near-endemic to Mozambique
- Species restricted to small areas or limited habitats
- Utilised taxa (timber, medicinal, and ornamental purposes)
- Taxa in close proximity to high impact areas (settlement areas, agricultural and industrial developments)

Application of the Red Data List Categories

The IUCN (1994) Red List categories and criteria were applied, based on evidence concerning numbers, trends in disappearance, and the distribution of taxa. Factors such as population pressure on a species, proximity to human settlements, and agricultural and industrial activities were taken into consideration. For example, if a species occurs near human settlements or agricultural and industrial activities, then it is more likely to be lost.

The *Vulnerable D2* category was applied judiciously in cases where species were found only in type localities, the distribution range was likely to be narrow, and if threats were known. The *Data Deficient* category was applied in cases where species were known only from the type collection or from a single locality and where no information regarding threats was available. The threatened categories (*Critically Endangered*, *Endangered* and *Vulnerable*) were applied when the risk of extinction was certain and known to be high. Only in a few exceptional cases—for example, *Raphia australis* and the 13 *Encephalartos* species recorded for Mozambique—was complete information available, that is, throughout the entire distribution range for the species concerned.

Results and Discussion

Red Data List

Some species found in the RDL presented here occur in previous, very prominent publications; the *World List of Threatened Trees* (Oldfield *et al.* 1998) listed 78 species and the 1997 *IUCN Red List of Threatened Plants* (Walter & Gillett 1998) listed 89 vascular plants (including trees) for Mozambique. In addition, several near-endemic species that occur in Mozambique were listed in Hilton-Taylor (1996) in the RDLs for Swaziland (Lebombo Mountains) and South Africa (Maputaland).

Some 300 species, by contrast, are listed in the list presented here. Of these, 122 are listed as *Critically Endangered* (CR), *Endangered* (EN), and *Vulnerable* (VU). Many species (139) have, however, been categorised as *Data Deficient* (DD). Virtually all of the DD species are known from only one or a few herbarium collections, with very sparse and irrelevant information on the specimen labels. Many species, moreover, are not properly identified or possess uncertain taxonomic identification.

In addition, the fact that few inventories were compiled for the interior and north of Mozambique, led to a far higher representation of southerly distributed plants on the Red Data List.

Certain plant species like *Dombeya cymosa*, *Carpodiptera africana*, *Corchorus junodii*, and *Grewia glandulosa*, which were represented in previous Red Data Lists, have been excluded from this List. This is partially because the IUCN (1994) categories take into account quantitative data and exclude these species as candidates for a Red Data List owing to their abundance in the wild.

With regard to plant families on the Red Data List, the Rubiaceae, Fabaceae (Leguminosae), and Euphorbiaceae are well-represented compared to other families (Table 2); this was an expected result, as these families are well-studied. The Orchidaceae of Mozambique, on the other hand, have been relatively poorly studied and are poorly represented because of a lack of field information. For example, *Eulophia biloba* is known only from a single specimen that was collected in 1895 near Beira, which today is a large coastal town. There are several similar examples from the Orchidaceae: *Eulophia bissacata*, *Disperis mozambicensis*, *Habenaria mossambicensis*, and *Liparis hemipiloides*. Similarly, little is understood about the Poaceae of Mozambique, as many species are known only from a specific location; this may be an artefact resulting from the general unpopularity of collecting grasses. Furthermore, many grasses particularly from the coastal areas, may have been introduced from other countries—the Mozambique coastline has hundreds of years of trade history with neighbouring countries on the African mainland and the surrounding islands.

Some 177 endemic species appear on the List (Table 3)—these endemics are found mainly in the Maputaland zone and the Chimanimanis. Some taxa have been listed as near-endemic (77 species), as they are

also found in South Africa, Swaziland, Tanzania, and Zimbabwe. It is, however, suspected that Mozambique possesses many more range-restricted species, especially in the north of the country. More inventories and field explorations are recommended in the northern countryside, as many species are likely to be shared across the Rovuma River and other political boundaries with Tanzania, presenting opportunities for collaborative field research.

Useful and Threatened Species

As in most other southern African countries, timber, medicinal, edible, and ornamental species are the most important groups of plant used in Mozambique. Close to 70% of the Mozambican population uses medicinal plants for basic healthcare (World Conservation Monitoring Centre 1992); urban markets in Maputo and Beira sell medicinal plants derived from many parts of the country.

In general, all utilised plants should be monitored, as they may be eligible for Red Lists, and their depletion will undoubtedly have serious socio-economic consequences. Timber species that were included in this List, such as *Milicia excelsa* (LR-nt) and *Azelia quanzensis* (LR-nt), should be monitored. Medicinal plants such as *Warburgia salutaris* (VU A2cd), used for alleviating throat complaints (Bandeira *et al.*, in press), should also be monitored. Species of *Encephalartos* are believed to be illegally exported for use as ornamental plants, mainly to neighbouring countries.

The major threats to plant species in Mozambique are related to uses of a non-sustainable nature and include:

- Heavy exploitation of natural resources for fuelwood
- Industrial development
- Traditional agricultural practices
- Human settlements and urbanisation

The most sensitive ecosystem zones include coastal areas and the areas surrounding main towns, owing to high population densities. In poverty-stricken areas, the main threat is deforestation for fuelwood and charcoal. Commercial deforestation takes place mainly in south-central Mozambique and in mangrove areas where there is a high abundance of woody tree species whereas industrial development and urbanisation are very high in Maputo and Sofala Provinces. In addition, destructive agricultural practices take place on a large scale, mainly in rural areas.



Inhamitanga Forest in pristine condition. (Photo: J. Burrows)



Inhamitanga Forest—the trail of destruction. (Photo: J. Burrows)

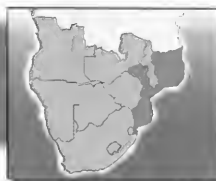
Conclusions and Recommendations

While compiling this List, several constraints were encountered: these range from a lack of information to the lack of a national checklist and incomplete and outdated information. We found that herbarium specimen information is an inadequate basis for determining Red Data List status for the plant species of Mozambique. Our knowledge of the flora of Mozambique is mostly restricted to southern Mozambique and field exploration in northern and central Mozambique is needed to update scientific information, as well as to increase the numbers of herbarium collections. Gathering information on endemics and near-endemics is especially important.

Collaboration with neighbouring countries (Malawi, South Africa, Swaziland, Tanzania, and Zimbabwe) and sharing of expertise are important elements that can assist in the compilation of botanical inventories.

These inventories will form a basis for directly assisting in national conservation planning, sustainable resource utilisation strategies, and further research priorities.

Acknowledgements We would like to express our sincere gratitude to the Red Data List National Working Group: Filomena Barbosa, Angelina Martins, Ana Bela Amude, Carla Ruas, Eduardo Massingue, Felisbela Gaspar, Silva Mulhovo, Köeti Seródio, Catarina Chidihamassamba, Maria da Luz Dai, and Agostinho Lisboa. Our thanks are extended to Janice Golding and Peter Phillipson who compiled and edited the Red Data List assessments. Marta Monjane and Paul Dutton, staff of Kew Herbarium (K), and anyone who directly or indirectly contributed to this work are also thanked.



Samira Izidine* & Salomão O. Bandeira†

Introdução

Moçambique esta localizado na costa sudeste da África Austral (latitude entre 10°27'S–26°52'S e longitude entre 30°52'E e 30°12'E–41°51'E) e tem uma área de aproximadamente 800,000 km² de superfície. O País faz fronteira com Tanzânia ao Norte; Malawi, Zâmbia, Zimbabwe e África do Sul a Oeste e Swazilândia e África do Sul a Sul. A linha costeira (Oceano Índico) é aproximadamente de 2,700 km de comprimento.

A Flora de Moçambique e maioritariamente caracterizada por possuir matagais de Miombo e de Mopane, mosaicos costeiros, capinzais e mangais (White 1983; Wild & Barbosa 1967). Tendo cerca de 5,692 espécies de plantas superiores, acreditase que algumas dessas espécies estejam sobre pressão por causas antropogénicas e naturais. Dos cerca de 800,000 km² apenas 11%

da área é conservada correspondendo a 2,676 km² de reservas florestais (Bandeira *et al.* 1994).

Em termos de endemismo, Moçambique possui dois principais centros de endemismo, nomeadamente o centro de endemismo de Maputoland a sul do país, abrange também a África do Sul e a Swazilândia e o centro de endemismo de Chimanimani no centro de Moçambique, abrangendo também o Zimbabwe. Algumas espécies que ocorrem nessas regiões e que foram listadas como endémicas poderão por isso ser “quasi-endémicas” e não endémicas podendo o contrário ter-se igualmente verificado. As espécies cuja distribuição não é totalmente conhecida incluem: *Hexalobus mossambicensis*, *Xylopia torrei* e *Mesanthemum africanum*. As espécies *Pseudosbeckia swynnertonii* e *Anthospermum animumioides* são quasi-endémicas e sua distribuição não é totalmente conhecida. Os inventários botânicos em Moçambique foram maioritariamente realizados no Sul, tendo o centro e norte beneficiado menos dos referidos inventários.

A grande concentração de pessoas nas cidades, associada as condições precárias na periferia dos centros urbanos, que estimula o desmatamento das florestas e savanas para suprimento do combustível lenhoso, tem sido a principal causa da contínua degradação das florestas e savanas moçambicanas. O desmatamento de vegetação pode atingir 147,077 ha por ano. Os mangais uma das principais vegetações costeiras de Moçambique é desmatado a um ritmo de 1,821 ha por ano (Barbosa *et al.* 2001). O desmatamento dos mangais é particularmente alto nas cidades de Maputo e Beira. Outras causas de perda de espécies incluem as práticas tradicionais de agricultura, cultivo em monocultura e desenvolvimento não sustentável.

A Lista Vermelha (Red Data List) para Moçambique surge assim como uma necessidade urgente de se identificar as espécies em risco de extinção e definir acções, estratégias e prioridades para a sua conservação.

Metodologia

Síntese da Informação

A primeira fase de compilação da Lista Vermelha foi a sintetização de informação das plantas ameaçadas ou potencialmente ameaçadas de extinção com base nas seguintes listas: Bandeira *et al.* (1994, 1996), Van Wyk (1994), Hatton & Mungumbe (1998), Oldfield *et al.* (1998) e Walter & Gillett (1998). Estas referências debruçaram-se sobretudo sobre plantas endémicas, medicinais e espécies lenhosas.

Após esta actividade realizou-se o primeiro workshop sobre a Lista Vermelha em Maputo, de 23 a 27 de Outubro de 2000, onde os participantes para além de terem sido treinados a usar as categorias e critérios da IUCN (1994), compilaram a informação existente e determinaram o estado de conservação das diferentes espécies. Para o efeito foram utilizadas outras fontes de informação como os depoimentos de botânicos e ecologistas (*Flora de Moçambique* e *Flora Zambeziaca*). Os espécimens dos Herbários LMA e LMU foram também utilizados com o objectivo de se identificar outros locais de distribuição.

A Extensão de Ocorrência e Área de Ocupação, i.e, alcance da distribuição, foi estimada mas os resultados obtidos eram pouco fiáveis em termos taxonómicos. A dispersão da sua distribuição, a ausência de informação sobre ameaças nos habitats, onde ocorriam as espécies, tornou o exercício de se fazerem pressupostos e inferências muito difícil.



***Ficus muelleriana*, endemic to Mozambique, is known from very few localities. (Photo: J. Burrows)**

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Tabela 1. 301 espécies foram listadas para a Lista Vermelha.

As categorias	Número de espécies
Extinto (EX)	1
Em Perigo Crítico (CR)	6
Em Perigo (EN)	6
Vulnerável (VU)	109
Baixo Risco Quase Ameaçado (LR-nt)	16
Baixo Risco Preocupação Menor (LR-lc)	23
Dados Insuficientes (DD)	139
Total	300

A avaliação da Lista Vermelha foi feita para as espécies:

- Endémicas e quasi- endémicas de Moçambique
- Circunscritas a áreas pequenas ou habitats
- Utilizadas (madeira, espécies medicinais, ornamentais)
- Próximas de áreas de grande impacto (áreas de povoamento, áreas com desenvolvimento agrícola e industrial)

Aplicação das Categorias da Lista Vermelha

Foi aplicada as categorias da IUCN (1994) que tiveram como base as evidências acerca do número, tendência de desaparecimento e distribuição dos taxa. Factores como a pressão humana sobre a espécie, a proximidade de áreas de assentamento e de desenvolvimento agrícola e industrial foi levada em consideração. Por exemplo os habitats das espécies estariam mais degradados se ocorressem perto de assentamentos humanos ou zonas de desenvolvimento agrícola ou industrial.

A categoria *Vulnerável D2* foi aplicada nos casos em que a planta foi somente encontrada em localidades típicas ou quando tivesse uma distribuição limitada. A categoria *Difícil de Dados* foi aplicada nos casos onde não houvesse informação disponível sobre as ameaças à espécie. As categorias ameaçadas (*Criticamente Ameaçadas*, *Ameaçadas*, e *Vulnerável*) foram aplicadas sempre que houvesse um perigo eminente de desaparecimento da espécie. Excepção para a *Raphia australis* e para as 13 espécies de *Encephalartos* registadas para Moçambique, cuja informação da sua distribuição é relativamente melhor conhecida.

Resultados e Discussão

A Lista Vermelha

Algumas espécies ameaçadas de Moçambique foram listadas nas seguintes publi-

cações: “*The World List of Threatened Trees*” (Oldfield *et al.* 1998) que listou 78 espécies para Moçambique; “*1997 IUCN Red Data List of Threatened Plants*” (Walter & Gillett 1998) listou 89 espécies vasculares de Moçambique, incluindo árvores. Várias espécies quasi-endémicas ocorrendo em Moçambique foram listadas por Hilton-Taylor (1996) na Lista Vermelha para a Suazilândia (Lebombos) e a África do Sul (Maputaland).

300 espécies foram listadas para a Lista Vermelha. Destas espécies, 122 foram listadas como sendo *Criticamente Ameaçadas* (CR), *Ameaçadas* (EN) e *Vulneráveis* (VU); 139 foram categorizadas como *Deficiência de Dados* (DD). Virtualmente quase todas as espécies DD tinham uma ou duas coleções de herbário, muito dispersas entre si e com pouquíssima informação nas respectivas etiquetas. Complicando ainda mais, muitas espécies não estavam correctamente identificadas. O facto de poucos inventários florísticos terem sido realizados no Centro e Sul do País levou a que a maior parte das espécies com mais informação fosse do Sul do País.

A avaliação baseada nas novas categorias da IUCN (1994), que tomou em conta aspectos quantitativos resultou na exclusão de algumas espécies de plantas. As espécies *Dombeya cymosa*, *Carpodiptera africana*, *Corchorus jumodii* e *Grewia glandulosa* que tinham sido representadas na primeira lista, foram excluídas desta lista. Isto é parcialmente devido ao facto de o sistema e critérios de categorização da IUCN (1994) basearem-se em dados quantitativos. Estes critérios excluem estas espécies devido a sua abundância no seu estado natural.

Em relação as famílias listadas na Lista Vermelha, as Rubiaceae, Fabaceae (Leguminosae) e Euphorbiaceae estão muito bem representadas, sendo este um resultado esperado devido ao facto de serem famílias grandes e relativamente bem estudadas. A família Orchidaceae está razoavelmente bem estudada mas pouco representada no

Lista Vermelha devido a falta de informação de campo. Por exemplo a *Eulophia biloba* é conhecida a partir de uma espécimen colhida na Beira (1895). Existem vários exemplos similares nas orquídeas (*Eulophia bissacata*, *Disperis mozambicense*, *Habenaria mossambicensis* e *Liparis hemipiloides*). Em relação a família Poaceae pouco se sabe pois muitas das espécies são conhecidas apenas de uma localidade específica se bem que isto seja resultado de pouca atracção para colheita de gramíneas. Muitas espécies de gramíneas, particularmente das zonas costeiras poderão ter sido introduzidas devido as trocas com outros Países da região e Ilhas.

Cerca de 177 das espécies endémicas listadas ocorrem principalmente nas regiões de Maputoland, a sul, e Chimanimani, no centro do País. 77 destas espécies foram listadas como quasi-endémicas pois ocorrem também na África do Sul, Suazilândia e Zimbabwe. Contudo espera-se que o País possua muito mais espécies endémicas especialmente no Norte do País. Daí a necessidade da realização do referido trabalho de campo nessa região do País, à volta do Rio Rovuma.

Espécies de Plantas Úteis e Ameaçadas

Em Moçambique os principais grupos de plantas úteis são as espécies madeiras, medicinais, alimentares e ornamentais. Apesar de nem todas as plantas úteis constarem na Lista Vermelha, elas devem ser monitoradas uma vez que são potenciais candidatas ao mesmo no futuro. A exportação de madeiras é uma actividade que a continuar deverá ser monitorada pois é muito importante para a economia do País. Algumas espécies de madeiras tais como: *Milicia excelsa* (LR-nt) e *Azelia quanzenis* (LR-nt) constam na Lista Vermelha e essas deverão merecer um controle efectivo quer pela Direcção Nacional de Floresta e Fauna Bravia na atribuição de quotas quer pelas Alfândegas no controle do movimento fronteiriço. Outras espécies muito utilizadas são as espécies medicinais nomeadamente a *Waburgia salutaris* que é largamente usada na cura de complicações da garganta

Tabela 2. Famílias com maior número de espécies na Lista Vermelha.

Famílias	Número de espécies
Rubiaceae	26
Fabaceae	20
Euphorbiaceae	15
Zamiaceae	13



Cross-checking distribution records of poorly-known taxa in LMA Herbarium. (Photo: J.S. Golding)

pela população em Moçambique (Bandeira *et al.* 2001).

Cerca de 70% da população moçambicana utiliza a medicina tradicional para os seus cuidados primários de saúde (World Conservation Monitoring Centre 1992). Mercados urbanos em Maputo e Beira vendem várias espécies medicinais que são colhidas em várias regiões do País. Espécies ameaçadas tais como a *Warburgia salutaris* e *Encephalartos* espécies (espécie ornamental) que já constam na Lista Vermelha são

ilegalmente exportadas e vendidas nos países vizinhos.

As maiores ameaças às espécies em Moçambique são:

- Exploração desenfreada dos recursos naturais para lenha e carvão
- Desenvolvimento industrial
- Práticas tradicionais de agricultura
- Assentamentos e urbanização

As zonas mais sensíveis são as zonas costeiras, as zonas na periferia das principais

cidades devido a grande densidade populacional. Nestas áreas ocorre principalmente a deflorestação onde grandes áreas têm sido devastadas para lenha e carvão. Na zona Sul de Moçambique a criação de projectos de desenvolvimento e a urbanização poderá ser uma ameaça a algumas espécies. Práticas tradicionais de agricultura, bem como a agricultura em monocultura são potenciais ameaças. Em termos de habitats ameaçados poderemos mencionar as matas do Sul, as florestas costeiras constituídas maioritariamente pelo Mangal e matas com espécies madeireiras.

Conclusões e Recomendações

Na compilação da Lista, apareceram vários obstáculos os quais variaram desde a falta de informação à falta de uma listagem nacional e informação incompleta ou não actualizada. Informação a partir das espécimens de herbários é insuficiente para determinar o estado de uma espécie vegetal na Lista Vermelha de Moçambique. O conhecimento da flora de Moçambique está limitado ao sul do País.

Inventários na zona central e norte do País são necessários por forma a actualizar a informação científica e aumentar o número de colecções nos herbários. A colheita de informação das espécies endémicas e quasi-endémicas é especialmente importante. Colaboração com Países vizinhos (Malawi, África do Sul, Suazilândia, Tanzânia e Zimbábue) e trabalho colaborativo são elementos importantes que podem dar assistência na compilação dos inventários botânicos. Esta assistência servirá de base na planificação da conservação no País, estratégias para o uso sustentável dos recursos e prioridades de pesquisa no futuro.

Agradecimentos Gostariamos de expressar a nossa sincera gratidão ao Grupo Nacional de Trabalho da Lista Vermelha nomeadamente: Filomena Barbosa, Angelina Martins, Ana Bela Amude, Carla Ruas, Eduardo Massingue, Felisbela Gaspar, Silva Mulhovo, Köeti Seródio, Catarina Chidiambamba, Maria da Luz Dai e Agostinho Lisboa. O nosso voto de agradecimento é extensivo a Janice Golding e Peter Philipson. Paul Dutton, Marta Monjane, Kew, e todo o pessoal que directa ou indirectamente contribuiu para a realização deste trabalho.



Participants at the RDL Workshop held in Maputo. (Photo: J.S. Golding)

EXTINCT & THREATENED

ACANTHACEAE

Blepharis dunensis Vallesen

Status: VU B1B2cD2

Endemism: Endemic

Threats: Mining

Distribution: Zambézia, Nampula

Coastal sand dunes, 0–25 m. Eight records from four localities, including recent collections from Maebase and Momo.

Blepharis gazensis Vallesen

Status: VU B1B2cD2

Endemism: Endemic

Distribution: Gaza

Calophaspermum woodland.

Blepharis swaziensis Vollesen

Status: VU D2

Endemism: Near-endemic

Threats: Habitat degradation

Distribution: Maputa

Open bushland and grassland. Lebamba narrow endemic. Also in South Africa and Swaziland.

Blepharis torrei Vallesen

Status: VU D2

Endemism: Near-endemic

Distribution: Niassa

Two collections from a locality in Mozambique (one from Tanzania). Acacia-Brachystegia baehmii wooded grassland on a concrete-like clayey hardpan, altitude 875 m.

Duvernaia acanitiflora A.Meeuse

Status: VU B1B2cD2

Endemism: Near-endemic?

Threats: Damming, agriculture

Distribution: Maputa

Forest margins, sometimes along rivers. It is probable that the Umbeluzi Dam has had an impact, the species could be extinct in Mozambique. One collection from Swaziland (Hlatikulu); also in South Africa.

AMARANTHACEAE

Celasia pandurata Baker

Status: VU D2

Endemism: Endemic

Distribution: Manhica e Sofala, Tete, Zambézia

Known from forests in central Mozambique.

ANACARDIACEAE

Lannea stuhlmannii (Engl.) Engl. var. *tamentosa*

Dunkley

Status: VU D2

Endemism: Endemic?

Distribution: Tete, Manhica

Widespread in the Flora zambesiaca area.

Ozoroa gomeziana R. & A.Fern.

Status: VU D2

Endemism: Endemic

Distribution: Inhambane

Known only from the type.

Rhus refracta Eckl. & Zeyh.

Status: VU D2

Distribution: Sofala

Found in deciduous forest. Also in South Africa.

ANNONACEAE

Hexabolus massambicensis N.Rabsan

Status: VU D2

Endemism: Endemic?

Distribution: Nampula, Caba Delgado, Niassa

Reported to be rare. Known only from about five localities in forest.

Xylopia callina Diels

Status: VU D2

Endemism: Near-endemic

Distribution: Caba Delgado

It is found in open woodland or thickets and on termitaria at 200–810 m. Also in Tanzania.

APIACEAE

Centella abtriangularis Cannon

Status: VU D2

Endemism: Endemic

Distribution: Manhica

Endemic to Chimanimani, known from the Mozambique side. In wet grassy slopes or banks.

ASTERACEAE

Vernania muelleri Wild subsp. *muelleri*

Status: VU D2

Endemism: Near-endemic

Distribution: Manhica

Chimanimani endemic. Also in Zimbabwe.

BALSAMINACEAE

Impatiens psycantha Launert

Status: VU D2

Endemism: Endemic

Distribution: Nampula, Zambézia

Altitude of 800 m. Found in Brachystegia forest.

Impatiens psychadelphiodes Launert

Status: VU D2

Endemism: Endemic

Threats: Agriculture

Distribution: Zambézia, Sofala

Impatiens salpinx Schulze & Launert

Status: VU D2

Endemism: Near-endemic

Distribution: Manhica

Altitude of 1,550 m. In wet conditions. Also in Zimbabwe.

BIGNONIACEAE

Dalichandrone alba (Sim) Sprague

Status: VU B1B2cD2

Endemism: Endemic

Threats: Habitat degradation, harvesting

Distribution: Gaza, Maputa, Inhambane

Found in dry deciduous woodland, fringing forests or thickets on sandy soils mainly near the coast. This is a utilised species.

BOMBACACEAE

Rhodognaphalan mossambicense (A.Robyns)

A.Robyns

Bombax mossambicense A.Robyns

Status: VU D2

Endemism: Endemic

Threats: Harvesting, collection

Distribution: Niassa, Zambézia

This species is apparently cultivated around Quelimane and the trunks are used for dugout canoes. Found in a variety of habitats.

CANELACEAE

Warburgia salutaris Engl.

Status: VU A2cd

Threats: Harvesting

Distribution: Maputa

Common name 'chibaha'. Fairly common in southern Mozambique. Wide distribution range outside Mozambique but heavily utilised according to baseline reports. Global status is Endangered.

CAPPARACEAE

Maerua andradae Wild

Status: VU D2

Endemism: Endemic

Distribution: Caba Delgado, Niassa

It is found in low-altitude Acacia woodland.

Maerua scandens (Klotzsch) Gilg

Status: VU D2

Endemism: Endemic

Distribution: Gaza

The species is known from dense Brachystegia woodland, apparently rather rare.

CELASTRACEAE

Elaeodendron fruticosum N.Rabsan

Status: VU B1B2cD2

Endemism: Endemic

Distribution: Inhambane, Gaza

Known only from the thicket in coastal areas.

Maytenus mossambicensis (Klotz.) Blakelock var.

guruensis N.Rabsan

Status: VU D2

Endemism: Endemic?

Distribution: Zambézia

Known only from two collections.

CHENOPODIACEAE

Sarcocornia massambicensis Brenan

Status: EN B1B2c

Endemism: Endemic

Threats: Habitat degradation, urban expansion, desiccation

Distribution: Inhambane

Apparently confined to a few salt marshes.

Sarcocornia natalensis (Bunge) A.J.Scott

Status: VU B1B2cD2

Threats: Habitat degradation, urban expansion, desiccation

Distribution: Maputa

Apparently confined to a few salt-marshes. Also in South Africa.

Suaeda sp. Caldeira & Marques 599

Status: EX

Endemism: Endemic

Threats: Habitat degradation, urban expansion, desiccation

Distribution: Maputo

Known only from one specimen (collected in 1965)

which is known from salt marshes near the coast. The only toxin in this genus in the Flora zambesiaca region that grows near the coast.

COMBRETACEAE

***Cambretum caudatisepalum* Exell & Garcia**

Status: VU D2

Endemism: Endemic

Distribution: Nampula, Niassa

Reported to be rare. Known only from about five localities in thickets.

***Cambretum stacksii* Sprague**

Status: VU D2

Endemism: Endemic

Distribution: Zambézia, Cabo Delgado, Niassa

In dense evergreen forest.

***Pteleopsis barbasae* Exell**

Status: VU D2

Endemism: Endemic

Distribution: Niassa

At low elevation in Acacia savanna.

COMMELINACEAE

***Triceratella drummandii* Brenan**

Status: VU D2

Endemism: Near-endemic?

Distribution: Nampula

Known only from two collections (Mozambique and Zimbabwe).

CONNARACEAE

***Raurea minar* (Gaertn.) Alston**

Status: VU D2

Endemism: Endemic?

Distribution: Sofala

Known only from a single collection.

CONVOLVULACEAE

***Ipamaea venasa* (Destr.) Roem & Schultes var.**

***obtusifalala* Verdc.**

Status: VU B1B2cD2

Endemism: Endemic

Threats: Habitat degradation

Distribution: Maputo

***Turbina langiflora* Verdc.**

Status: VU D2

Endemism: Endemic

Distribution: Inhambane, Maputo, Gaza

In sandy soil at 310 m. It is a globose herb.

CRASSULACEAE

***Crassula expansa* Dryand. var. *langifolia* R.Fern.**

Status: VU D2

Endemism: Endemic

Distribution: Inhambane

***Crassula leachii* R.Fern.**

Status: VU D2

Endemism: Endemic

Threats: Agriculture, habitat degradation

Distribution: Manhica e Sofala

Known from granite rocks. Known only from two collections.

***Crassula maputensis* R.Fern.**

Status: EN B1B2c

Endemism: Near-endemic

Distribution: Maputo

Also in South Africa.

***Crassula morrumbalensis* R.Fern.**

Status: VU B1B2cD2

Endemism: Endemic

Threats: Agriculture, habitat degradation

Distribution: Zambézia, Gaza

In the savannas of mountainous slopes.

***Kalanchoe fernandesii* Raym.-Hamet**

Status: VU B1B2cD2

Endemism: Endemic

Threats: Fire

Distribution: Nampula

Known only from the type locality (1950). In xerophytic forest near the river or in open places in forests.

***Pteracephalus centenii* Cannon**

Status: VU D2

Endemism: Endemic

Distribution: Manhica

This species is known only from the type specimen.

Found at the edge of a cloud forest dominated by

Podocarpus.

CUCURBITACEAE

***Caccinia subglabra* C.Jeffrey**

Status: VU D2

Endemism: Endemic

Distribution: Nampula

Found in coastal forest at 40–130 m. Known only from this locality.

DICHAPETALACEAE

***Dichapetalum zambesianum* Torre**

Status: VU D2

Endemism: Endemic

Distribution: Cabo Delgado, Zambézia

In deciduous and secondary woodland.

***Dichapetalum mendoncae* Torre**

Status: VU D2

Endemism: Endemic

Distribution: Inhambane

In mixed woodland.

EBENACEAE

***Diospyros anitae* F.White**

Status: VU D2

Endemism: Endemic

Distribution: Nampula

Known only from the type locality. Found in

Brachystegia woodland at 450 m.

ERICACEAE

***Erica pleiatrixa* S.Moore var. *bleriaides* (Wild)**

R.Ross

Status: VU D2

Endemism: Near-endemic?

Distribution: Manhica e Sofala, Maputo

Found in damp places amongst rocks near summits of mountains at altitudes of 900–2,300 m. Also in Zimbabwe.

Erica pleiatrixa* S.Moore var. *pleiatrixa

Status: VU D2

Endemism: Near-endemic?

Distribution: Manhica e Sofala, Maputo

Found in damp places among rocks near summits of mountains 1,800–2,400 m. Also in Zimbabwe.

***Erica wildii* Brenan**

Status: VU D2

Endemism: Endemic?

Distribution: Manhica e Sofala

Found in upland grassland and savanna and amongst rocks. Altitude 1,050–2,400 m. Also in Zimbabwe.

EUPHORBIACEAE

***Craton aceroides* Radcl.-Sm.**

Status: VU D2

Endemism: Endemic

Distribution: Inhambane

Locally common on the margins of dry coastal forest in pollid sands. The species is known only from the type collection.

***Craton inhambanensis* Radcl.-Sm.**

Status: VU D2

Endemism: Endemic

Distribution: Inhambane

This is a very distinctive species. It is known only from two collections. It is found on low-altitude coastal plains in dry sandy soils with *Androstachys johnsonii*.

Craton leuconeurus* Pax subsp. *mossambicensis

Radcl.-Sm.

Status: VU D2

Endemism: Endemic

Distribution: Manhica e Sofala

***Euphorbia plenispina* S.Carter**

Status: VU D2

Endemism: Endemic

Distribution: Sofala, Inhambane

Known only from the type (Corvolho 1019 (1968)).

Found amongst lichens.

FLACOURTIACEAE

***Homalium massambicensis* Paiva**

Status: VU B1B2cD2

Endemism: Endemic

Distribution: Cabo Delgado, Zambézia

In lowland forest.

GESNERIACEAE

***Streptacarpus brachynema* Hilliard & B.L.Burt**

Status: VU D2

Endemism: Endemic

Gorongozo endemic. On rocks or tree trunks in forest.

***Streptacarpus grandis* N.E.Br. subsp.**

***septentrionalis* Hilliard & B.L.Burt**

Status: VU D2

Endemism: Near-endemic?

Distribution: Manhica

Chimonimoni endemic. On damp quartzitic rock in stream gullies. Also in Zimbabwe.

***Streptacarpus michelmarei* B.L.Burt**

Status: VU D2

Endemism: Near-endemic?

Distribution: Manhica

Chimonimoni endemic. Also in Zimbabwe.

***Streptacarpus myoporoides* Hilliard & B.L.Burt**

Status: VU D2

Endemism: Endemic

Distribution: Nampula

LEGUMINOSAE: CAESALPINIOIDEAE

***Icuria dunensis* Wieringa**

Status: EN A2c

Endemism: Endemic

Threats: Harvesting

Distribution: Nampula, Zambézia

In large communities on sandy, coastal dunes. Forms nearly monospecific forests on older dunes in dry land. Confused with *Hymenaea verrucosa*. The timber is valuable but wood is not durable. Bark is stripped to make cones. Known from a number of specimens.

LEGUMINOSAE: MIMOSOIDEAE

Acacia torrei Brenan

Status: VU D2
Endemism: Endemic?
Distribution: Safala
Faund in savanna.

Entada mossambicensis Torre

Status: VU D2
Endemism: Endemic
Distribution: Nampula
A forest species.

Entada schlechteri (Harms) Harms

Status: VU A1cB1B2cD2
Endemism: Endemic
Threats: Urban expansion
Distribution: Maputa, Gaza

Mimosa mossambicensis Brenan

Status: VU D2
Endemism: Endemic
Distribution: Tete

Xylia mendoncae Torre

Status: VU D2
Endemism: Endemic
Distribution: Inhambane
Known only from the type collection.

LEGUMINOSAE: PAPILIONOIDEAE

Rhynchosia chimanimaniensis Verdc.

Status: VU D2
Endemism: Near-endemic
Distribution: Manhica
Chimanimani endemic. Altitude of 1,500–1,900 m. Also in Zimbabwe.

LINACEAE

Hugonia elliptica N.Robson

Status: VU D2
Endemism: Endemic
Distribution: Zambézia
Altitude of 150 m. Habitat unknown.

Hugonia grandiflora N.Robson

Status: VU D2
Endemism: Near-endemic
Distribution: Niassa
Evergreen forest at 500 m. Also in Tanzania.

LOBELIACEAE

Lobelia cobaltica S.Moore

Status: VU D2
Endemism: Near-endemic
Distribution: Manhica
Chimonimani endemic. Also in Zimbabwe?

LORANTHACEAE

Englerina schlechteri (Engl.) Polhill & Wiens

Status: VU D2
Endemism: Endemic
Distribution: Maputo

LYTHRACEAE

Ammania elate R.Fern.

Status: VU D2
Endemism: Endemic
Distribution: Zambézia
In marshy places of riverbanks.

Nesaea moggii R.Fern.

Status: VU D2
Endemism: Endemic
Distribution: Nampula
Known only from the type. In freshwater swamps near the coast. Possibly known only from the type collection by Mogg 32410 (1965).

Nesaea pedroi R.Fern. & Diniz

Status: VU D2
Endemism: Endemic
Distribution: Caba Delgada, Nampula
In marshy places.

Nesaea pygmaea R.Fern. & Diniz

Status: VU D2
Endemism: Endemic
Distribution: Nampula
Near the coast?

Nesaea ramosa R.Fern.

Status: VU D2
Endemism: Endemic
Distribution: Inhambane
Various habitats.

Nesaea ramosissima R.Fern. & Diniz

Status: VU D2
Endemism: Endemic
Distribution: Niassa
In swamps and an riverbanks.

Nesaea spathulata R.Fern.

Status: VU D2
Endemism: Endemic
Distribution: Safala
In wetlands in black soil. Altitude of 32 m.

MALPIGHIACEAE

Triaspis nelsonii Oliv. subsp. *canescens* (Engl.)

Launert
Status: VU D2
Endemism: Endemic
Distribution: Maputa, Gaza
Apparently known only from Mazambique, although recorded very close to the South African border.

MALVACEAE

Hibiscus torrei Baker

Status: VU D2
Endemism: Endemic
Threats: Human degradation, agriculture
Distribution: Niassa, Tete
Known from damp, humid places.

MELASTOMATACEAE

Dissotis angustifolia A. & R.Fern.

Status: VU D2
Endemism: Endemic
Distribution: Nampula
Coastal area.

Dissotis pulchra A. & R.Fern.

Status: VU D2
Endemism: Near-endemic
Distribution: Manhica
Chimanimani endemic, along streams and rock crevices.
Altitude of 1,650 m. Also in Zimbabwe.

Memecylon insulare A. & R.Fern.

Status: VU D2
Endemism: Endemic
Distribution: Inhambane
On recent sandstones.

Pseudosbeckia swynnertonii (E.G.Baker) A. & R.Fern.

Status: VU D2

Endemism: Near-endemic?

Distribution: Manhica
Grows at 1,350 m altitude. Known only from a single collection (1964). Faund in Brachystegia woodlands along the rivers. Also in Zimbabwe.

MONTINIACEAE

Grevea eggelingii Milne-Redh. subsp. *echinocarpa* (Mendes) Verdc.

Status: VU D2
Endemism: Near-endemic
Distribution: Caba Delgada
Riverine forest. Also in Tanzania.

MORACEAE

Dorstenia zambesiaca Hijman

Status: VU D2
Distribution: Manhica e Safala
Possibly a taxonomic problem. Reported to be one of the rarest Moraceae. The type is from Mazambique, collected by Müller & Pape 520 (1971). Also known from Tanzania and Kenya. In leaf litter of mixed evergreen forest.

OCHNACEAE

Ochna beirensis N.Robson

Status: VU B1B2cD2
Endemism: Endemic
Distribution: Safala
Known from deciduous woodland in evergreen scrub near sea level.

PASSIFLORACEAE

Adenia mossambicensis de Wilde

Status: VU D2
Endemism: Endemic
Distribution: Caba Delgada, Nampula
On granite; altitude of 450 m.

Adenia zambesiensis R. & A.Fern.

Status: VU D2
Endemism: Endemic
Distribution: Zambézia

POACEAE

Baptorhachis foliaceae (Clayton) Clayton

Status: VU D2
Endemism: Endemic
Distribution: Nampula
Manaspecific genus.

Danthoniopsis chimanimaniensis (Phipps) Clayton

Status: VU D2
Endemism: Near-endemic?
Distribution: Manhica
Chimanimani endemic in rocky places along streams. Also in Zimbabwe.

Digitaria appropinquata Goetgh.

Status: VU D2
Endemism: Endemic
Distribution: Zambézia

Digitaria fuscopilosa Goetgh.

Status: VU D2
Endemism: Endemic
Distribution: Manhica

Digitaria megasthenes Goetgh.

Status: VU D2
Endemism: Endemic
Distribution: Niassa, Zambézia

POLYGALACEAE

Polygala francisci Exell
Status: VU D2
 Endemism: Endemic
 Distribution: Manhica, Inhambane
Open bush in white sand and on the edges of dense mixed woodland.

RHIZOPHORACEAE

Cassipourea obovata Alston
Status: VU D2
 Distribution: Cabo Delgado
Known only from the type (collected in 1911).

RUBIACEAE

Anthospermum ammannioides S.Moore
Status: VU D2
 Endemism: Near-endemic?
 Distribution: Manhica
Chimanimani endemic. Found at forest edges. Known from very high altitudes. (2,300 m). In Zimbabwe, it is known from Stonehenge Plateau.

Anthospermum vallicola S.Moore
Status: VU D2
 Endemism: Near-endemic
 Distribution: Sofala
Known only from the summit of Mount Peni of the Chimanimanis in Zimbabwe. Altitude of 1,700–2,600 m. It is found in scrub dominated by Erica species.

Conostomium gazense Verdc.
Status: VU D2
 Endemism: Endemic
 Distribution: Gaza
The ecology of this species is unknown.

Oldenlandia verrucitesta Verdc.
Status: VU D2
 Endemism: Endemic
 Distribution: Zambézia
Thin soil over rock.

Spermacoce kirkii (Hiern) Verdc.
Status: VU B1B2cD2
 Endemism: Endemic
 Distribution: Inhambane, Sofala
Open shady places near the seashore. Often associated with mangroves.

RUTACEAE

Fagara schlechteri Engl.
Status: VU B1B2cD2
 Endemism: Endemic
 Threats: Habitat degradation
 Distribution: Maputo, Inhambane
Coastal dunes.

SAPINDACEAE

Allophylus mossambicensis Exell
Status: VU B1B2cD2
 Endemism: Endemic
 Distribution: Maputo, Gaza, Inhambane
Forest, including sacred forest. Found in coastal dunes, mixed forests and forest margins.

Deinbollia borbonica Scheff.
Status: VU A2cB1B2bcD2
 Distribution: Nampula
Recently recorded as being common around Momo in mining concession areas. Also in Tonzonia, Kenya and Somalia.

STERCULIACEAE

Cola mossambicensis Wild
Status: VU A1a
 Endemism: Near-endemic
 Threats: Agriculture
 Distribution: Zambézia, Manhica
The main subpopulations occur in Mozambique. In evergreen forest up to about 600 m (above this altitude replaced by C. greenwayi). The species is said to be rare. Apparently also in Malawi.

Dombeya lastii K.Schum.
Status: VU B1B2cD2
 Endemism: Endemic
 Distribution: Zambézia

Dombeya leachii Wild
Status: VU B1B2D2
 Endemism: Endemic
 Distribution: Nampula
On inselbergs.

Sterculia appendiculata K.Schum. ex Engl.
Status: VU A1ad
 Threats: Harvesting
 Distribution: Tete, Manhica e Sofala
Under pressure for firewood, timber for local construction; regeneration difficult. Regarded as being of secondary quality. In coastal and riverine forest. Also known from Molawi (lower Shire River) and the former Tanganyika area. Modest reduction in the abundance of this species.

Sterculia quinqueloba (Garcke) K.Schum.
Status: VU A1ad
 Threats: Harvesting
 Distribution: Gaza, Inhambane, Manhica e Sofala
Under pressure for firewood, timber for local construction, regeneration difficult. Regarded as being of secondary quality. Modest reduction in the abundance of this species. Grows in other countries.

TURNERACEAE

Tricliceras auriculatum (A. & R.Fern.) R.Fern.
Status: VU D2
 Endemism: Endemic
 Distribution: Nampula, Zambézia
On granitic rocks.

Tricliceras elatum (A. & R.Fern.) R.Fern.
Status: VU D2
 Endemism: Endemic
 Distribution: Nampula
From savanna, xerophytic scrub on sandy soils.

Tricliceras lanceolatum (A. & R.Fern.) R.Fern.
Status: VU D2
 Endemism: Endemic
 Distribution: Manhica, Nampula
In open Brachystegia forest or sandy or clay sands near the coast.

Tricliceras longipedunculatum (Mast.) R.Fern. var. *eratense* R.Fern.
Status: VU D2
 Endemism: Endemic
 Distribution: Nampula
Along river margins.

VAHLIACEAE

Vahlia capensis (L.f.) Thunb. subsp. *macrantha* (Klotzsch) Bridson
Status: VU D2
 Endemism: Endemic
 Threats: Damming
 Distribution: Zambézia
Collected along sand banks.

VISCACEAE

Viscum littoreum Polhill & Wiens
Status: VU D2
 Endemism: Endemic?
 Distribution: Cabo Delgado?
Also possibly in Tanzania.

VITACEAE

Cissus bathyrhachodes Werderm.
Status: VU D2
 Distribution: Zambézia, Manhica e Sofala
In two localities in coastal/central Mozambique. Also in Tanzania.

Cyphostemma barbosae Wild & R.B.Drumm.
Status: EN B1B2cC2b
 Endemism: Endemic
 Threats: Habitat degradation, urban expansion
 Distribution: Maputo
The locality of this species is known to be degraded and under considerable human pressure.

Cyphostemma trachyphyllum (Werderm.) Descoings
Status: VU D2
 Distribution: Cabo Delgado
One locality in northern Mozambique. In sandy soils, and also found in coastal Tanzania.

ZAMIACEAE

Encephalartos aplanatus Vorster
Status: EN A1acdB1B2abcd
 Endemism: Near-endemic
 Threats: Collection
 Distribution: Maputo
Also found in Swaziland. This species was described from a population of about six individuals near the Swaziland–Mozambique border. Subsequently, several subpopulations have been found. There are at least 2,000 individuals remaining in the wild in Mozambique. More than 50% of the population has been poached. Age-class structure is skewed. Globally, this species is considered VU A1acdB1B2abcdeC2a.

Encephalartos chimanimaniensis R.A.Dyer & I.Verd.
Status: EN C2a
 Endemism: Near-endemic
 Threats: Collection
 Distribution: Manhica
Chimanimani Mountain endemic, where it is associated with schist and quartzite at slightly higher altitudes than E. manikensis. The species is also known from Zimbabwe where it is now thought to be extinct. Global status is EN A1odC2o.

Encephalartos lebomboensis I.Verd.
Status: CR A1acdeB1B2abcde
 Endemism: Near-endemic
 Threats: Collection
 Distribution: Maputo
Also known from South Africa and Swaziland. A very small proportion of the global distribution range is in Mozambique. Poor recruitment observed at the known subpopulations in Mozambique. The species is probably not more widely distributed in Mozambique. Most of the plants are old and scattered in their distribution. Globally, it is categorised as EN A1acdB1B2cdC2o.

Encephalartos munchii R.A.Dyer & I.Verd.
Status: CR A1dB1B2eC2bd
 Endemism: Endemic
 Threats: Collection
 Distribution: Manhica
Known only from a single, very distinctive locality in Mozambique. The species has been heavily poached to

near extinction during the last few years. Only a few individuals remain.

***Encephalartos ngoyanus* I. Verd.**

Status: CR C2aD

Threats: Collection

Distribution: Maputo

The distribution of this species is centred in South Africa and Swaziland, and reaches the end of its range in southern Mozambique. Grows in a grassy habitat. No threats are evident at the known localities. Globally, it is categorised as VU B1B2c.

***Encephalartos pterogonius* R.A. Dyer & I. Verd.**

Status: CR A1dB1B2eC2bD

Endemism: Endemic

Threats: Collection

Distribution: Manhica e Safala

The only known locality of this species is extremely inaccessible. Few individuals now remain at this locality as collectors have recently illegally removed many individuals.

***Encephalartos senticosus* Vorster**

Status: CR B1B2ae

Endemism: Near-endemic

Threats: Collection

Distribution: Maputo

This species is also known from South Africa and Swaziland. The population in Mozambique has declined to alarmingly low levels. Globally, it is considered as VU A1cd.

***Encephalartos umbeluziensis* R.A. Dyer**

Status: CR A2cB1B2abcde

Endemism: Near-endemic

Threats: Collection

Distribution: Maputo

It is usually found in hot, dry river valleys. Also known from Swaziland. Globally, it is considered VU A1cdB1B2cdC2o.

***Stangeria eriopus* (Kuntze) Baill.**

Status: VU C2bD1D2

Threats: Collection

Distribution: Maputo?

Locality fairly safe. Also known from South Africa. Global status is LR-nt.



Ribaue granite hills are nodes for biodiversity. (Photo: J. Burrows)

LOWER RISK

ACANTHACEAE

Sclerochiton apiculatus Vollesen

Status: LR-lc

Distribution: Maputo

Common in vast numbers along roadsides in the rainy season. Also in KwaZulu-Natal (South Africa). Limited global distribution.

ALOACEAE

Aloe ballii Reynolds

Status: LR-lc

Distribution: Manhica

Grows hanging down sheer rock faces. In South Africa, Swaziland and Zimbabwe. Limited distribution range.

ANACARDIACEAE

Ozoroa reticulata (Baker f.) R. & A. Fern. subsp. *faveolata* R. & A. Fern.

Status: LR-nt

Endemism: Endemic

Distribution: Nampula, Niassa, Caba Delgada, Tete

Found in dense, xerophytic closed forest.

ANNONACEAE

Xylopia torrei N. Robson

Status: LR-nt

Endemism: Endemic?

Distribution: Gaza, Inhambane

Dry forests and forest margins. Altitudes of 100–150 m. The shrub grows to about 2 m tall.

APOCYNACEAE

Adenium swazicum Stapf

Status: LR-lc

Endemism: Near-endemic

Distribution: Maputo

Known from at least five localities. A Lebomba endemic. Also known from South Africa and Swaziland.

ASTERACEAE

Gutenbergia westii (Wild) Wild & G. V. Pope

Status: LR-nt

Endemism: Near-endemic

Distribution: Manhica

Chimanimani endemic. Also in Zimbabwe. Found in woodland.

BORAGINACEAE

Cordia stuhlmannii Gurke

Status: LR-lc

Endemism: Endemic?

Distribution: Zambézia, Sofala

Found in thicket.

CAPPARACEAE

Cleome bororensis (Klotzsch) Oliv.

Status: LR-lc

Endemism: Near-endemic

Distribution: Sofala, Maputo, Zambézia, Gaza, Inhambane

It is said that the species has an extensive range in Mozambique. Also in Tanzania.

COMBRETACEAE

Combretum lasiocarpum Engl. & Diels

Status: LR-lc

Endemism: Endemic

Distribution: Nampula, Zambézia, Niassa

In dry deciduous tree or shrub savanna at lower altitudes.

CRASSULACEAE

Kalanchoe hametiorum Raym.-Hamet

Status: LR-nt

Endemism: Endemic

Distribution: Nampula, Zambézia

The type is from Nampula, collected in 1963. Found amongst rocks.

DICHAPETALACEAE

Dichapetalum barbosae Torre

Status: LR-lc

Distribution: Near-endemic

Distribution: Caba Delgada, Zambézia, Manhica e

Sofala

Found in dry bush and on margins of rivers. Recently recorded in Tanzania.

EUPHORBIACEAE

Jatropha scaposa Radcl.-Sm.

Status: LR-lc

Endemism: Endemic

Distribution: Nampula, Sofala, Maputo

Known from several collections. Found along coastal plains in sandy soil. Seems to be widespread along the coast of Mozambique, but very little is known.

LEGUMINOSAE: CAESALPINIOIDEAE

Afzelia quanzensis Welw.

Status: LR-nt

Threats: Forestry exploitation

Distribution: Tete, Gaza, Inhambane, Niassa, Caba Delgada, Zambézia

Over-exploitation for local construction industry and for exportation. Common names are 'chanfuta', 'kangauwa' and 'muoco'. The species grows in Tropical Africa (height to 35 m), but in Mozambique and KwaZulu-Natal (South Africa), it grows up to 20 m. Often the dominant species in deep sandy soil, mainly in sandveld forest. For the past 50 years, used extensively for the manufacture of plywood, panelling, parquet floors and musical instruments. A tree with a good shape can be obtained from seed after seven years. Found throughout Mozambique.

LEGUMINOSAE: MIMOSOIDEAE

Xylia torreana Brenan

Status: LR-lc

Distribution: Manhica e Sofala, Inhambane

Found in deciduous woodland with *Colaphospermum mopane*. This is a widely distributed species. Also in Zimbabwe, Zambia and South Africa.

LEGUMINOSAE: PAPILIONOIDEAE

Milletia mossambicensis Gillett

Status: LR-nt

Threats: Forestry exploitation

Over-exploitation for local construction industry and for exportation. Widespread in Mozambique.

Milletia stuhlmannii Taubert

Status: LR-lc

Threats: Forestry exploitation

Over-exploitation for local construction industry and for exportation. Widespread in Mozambique.

LORANTHACEAE

Agelanthus igneus (Danser) Polhill & Wiens

Status: LR-nt

Endemism: Near-endemic?

Distribution: Caba Delgada

Also in Tanzania.

LYTHRACEAE

Nesaea linearis Hiern

Status: LR-lc

Endemism: Endemic

Distribution: Nampula, Zambézia

Widespread in Mozambique. On clay soil.

MELIACEAE

Khaya anthotheca (Welw.) C. DC.

Status: LR-lc

Distribution: Manhica e Sofala, Gaza, Inhambane, Caba Delgada, Nampula, Niassa

Known from the following countries: Angola, Cameroon, Congo, Côte d'Ivoire, DR Congo, Ghana, Liberia, Malawi, Mozambique, Nigeria, Sierra Leone, Tonzonio, Uganda, Zambia and Zimbabwe.

MENISPERMACEAE

Cissampelos hirta Klotzsch

Status: LR-lc

Endemism: Endemic

Distribution: Inhambane, Manhica, Maputo

MORACEAE

Milicia excelsa Welw.

Status: LR-nt

Threats: Forestry exploitation

The species is being heavily harvested and exported.

MYRTACEAE

Syzygium masukuense (Baker) R. E. Fr. subsp.

pachyphyllum F. White

Status: LR-nt

Distribution: Manhica

Found at 1,600 m. Also in Zimbabwe.

OCHNACEAE

Ochna angustata N. Robson

Status: LR-nt

Endemism: Endemic

Distribution: Sofala, Zambézia

The species is known only from Beira northwards in areas within 40 km of the coast

POACEAE

Cenchrus mitis Andersson

Status: LR-nt

Distribution: Nampula
Coastal bushland. Also in Kenya and Tanzania.

Eriochloa rovumensis (Pilg.) Clayton

Status: LR-nt

Distribution: Caba Delgada
Also in Tanzania.

Panicum peteri Pilg.

Status: LR-lc

Distribution: Manhica
Also in Zimbabwe and Tanzania.

Panicum pleianthum Peter

Status: LR-lc

Distribution: Maputa
From southern Mozambique coastal forest. Also in Kenya and Tanzania.

RUBIACEAE

Psychotria amboniana K.Schum. subsp. mossambicensis (Petit) Verdc.

Psychotria albidocalyx var. *mossambicensis* Petit

Status: LR-nt

Endemism: Endemic

Threats: Habitat degradation; human settlements
Distribution: Maputa

Endemic to dune vegetation and forest at not more than 150 m above sea level. This species possibly occurs over a wide area. It is found in a sensitive habitat.

SAPINDACEAE

Allophylus torrei Exell & Mendonça

Status: LR-lc

Endemism: Endemic

Distribution: Caba Delgado, Nampula
Brachystegia woodland and amongst rocks. Known from many herbarium collections.

SCROPHULARIACEAE

Jamesbrittenia carvalhoi (Engl.) Hilliard

Status: LR-lc

Endemism: Near-endemic

Distribution: Manhica e Safala
Also in Zimbabwe.

SOLANACEAE

Solanum litoraneum A.E.Gonç.

Status: LR-lc

Endemism: Endemic

Distribution: Inhambane, Maputa
At 200 m above sea level. In the littoral vegetation of dunes. Very close to the sea.

Solanum torreanum A.E.Gonç.

Status: LR-lc

Endemism: Endemic

Distribution: Maputa
Type is from Matala collected by Balsinhas 1466 (1969). Known only from Maputa from several collections. In dry Acacia forest, on sandy/sandy-clay soils at low altitudes, growing in ruderal places. Fairly localised.

STERCULIACEAE

Cola clavata Mast.

Status: LR-lc

Endemism: Near-endemic?

Distribution: Zambézia, Safala
Poorly known taxon. Also perhaps in Malawi.

Sterculia schliebenii Mildbr.

Status: LR-lc

Distribution: Caba Delgada

Also in Kenya and Tanzania.

TILIACEAE

Glyphaea tomentosa Mast. ex Oliv.

Status: LR-lc

Endemism: Endemic

Distribution: Nampula, Zambézia, Safala, Niassa

Occurs in deciduous woodland.

ZAMIACEAE

Encephalartos ferox Bertol.f.

Status: LR-nt

Endemism: Near-endemic

Threats: Collection

Distribution: Maputa

Its characteristic habitat is wide coastal sand dunes although the species has been observed at a locality almost 150 km inland. The species may need to be monitored as many coastal dune areas in Mozambique are earmarked for development. Also known from KwaZulu-Natal (South Africa). Global status is LR-lc.

Encephalartos gratus Prain

Status: LR-nt

Threats: Collection

Distribution: Zambézia

Many localities are well protected by landmines and poor road infrastructure. The biggest predicted threats are coffee and tea plantations, and possibly afforestation. Recruitment is very good. Past population declines are less than 10%. Also known from Malawi. Global status is VU A2cd.

Encephalartos manikensis (Gilliland) Gilliland

Status: LR-nt

Threats: Collection

Distribution: Manhica

Usually found on large granite inselbergs and only in river valleys in places associated with forests. It has a wider distribution than *E. chimanimaniensis*. Many unrecognised names have been given to this taxon, such as *E. tangwendle*, *E. bandulensis* and *E. chinahazany*, but these are treated as illegitimate names. Also known from Zimbabwe. Global status is VU A1cd.

Encephalartos turneri Lavranos & D.L.Goode

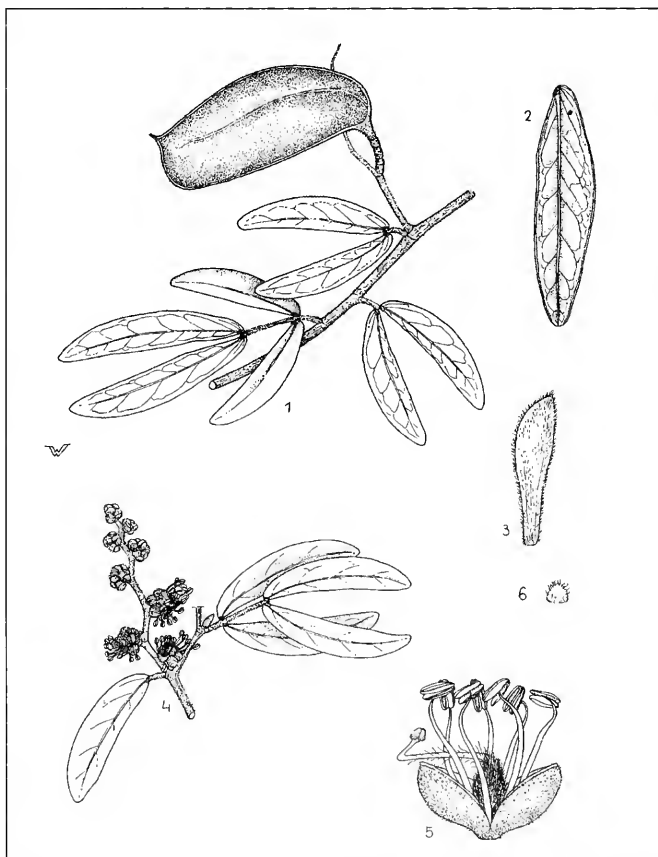
Status: LR-lc

Endemism: Endemic

Threats: Collection

Distribution: Caba Delgado, Nampula

The species grows in shallow soils on a steep, extremely inaccessible inselberg. There are probably further subpopulations further inland. No threats are anticipated as areas around inselbergs are subjected to subsistence agriculture. Occurs in vast numbers.



Icuria dunensis (Fabaceae), a recently described monotypic tree genus from Moçambique. It was described from a small coastal area that was earmarked for development. Many more species and genera await description not only in Mozambique, but in many other southern African countries. (Drawing: W. Wessels, permission obtained from J. Wieringa)

DATA DEFICIENT

ACANTHACEAE

Crossandra fruticulosa Lindau

Status: DD

Endemism: Near-endemic

Distribution: Maputo

Also from South Africa and Swaziland. Narrow distribution range.

Crossandra pinguior S.Moore

Status: DD

Endemism: Endemic

Distribution: Tete

Also from Zombio.

Crossandra pyrophila Vollesen

Status: DD

Endemism: Endemic

Distribution: Niassa, Zambézia

Also from Malawi.

Ecballium hastatum Vollesen

Status: DD

Endemism: Endemic

Distribution: Gaza, Inhambane

Reported to be rare. Known only from two localities in bushland.

Sclerachitan caeruleus (Lindau) S.Moore

Status: DD

Endemism: Near-endemic

Distribution: Manhica, Inhambane, Maputo, Niassa,

Zambézia, Gaza

Dry semi-deciduous forest, often on margins; altitude of 10–450 m. Also known from eastern Zimbabwe.

Sclerachitan hirsutus Vollesen

Status: DD

Endemism: Endemic

Distribution: Zambézia

Riverine forest; altitude 1,150 m.

ALOACEAE

Aloe hazeliana Reynolds

Status: DD

Endemism: Near-endemic?

Distribution: Manhica

Chimonimoni endemic. Also in Zimbabwe. Collected in pockets of soil in rock fissures of altitudes up to 2,200 m.

Aloe hawmanii Reynolds

Status: DD

Endemism: Near-endemic

Distribution: Manhica

Chimonimoni endemic, along the Zimbabwe–Mozambique border. Also in Zimbabwe. Grows hanging down on sheer rock faces. Altitudes of 1,600–2,000 m. Plants rarely survive in cultivation.

Aloe munchii Christian

Status: DD

Endemism: Near-endemic

Distribution: Manhica

Chimonimoni endemic. Altitude of 1,700 m. Also in Zimbabwe.

Aloe plowesii Reynolds

Status: DD

Endemism: Near-endemic

Distribution: Manhica

Chimonimoni endemic (known from the oreo along the border). Also in Zimbabwe. Grows in grass amongst sandstone boulders. Reynolds recognised two forms—shorter, narrow and more erect leaves of Martins Falls

(east of Point 71) and a more robust form at the head of 'Dead Cow Gulch'.

Alae rupestris Baker

Status: DD

Threats: Urban expansion, habitat degradation

Distribution: Maputo

The species is found in toll bush and amongst Euphorbia and other trees. Also in South Africa and Swaziland.

Aloe suffulta Reynolds

Status: DD

Threats: Urban expansion, habitat degradation

Distribution: Maputo

The plant has a long inflorescence. Is a twiner.

Alae wildii (Reynolds) Reynolds

Status: DD

Endemism: Near-endemic

Distribution: Manhica

Chimonimoni endemic. The species has been said to be extremely common. Also in Zimbabwe.

AMARANTHACEAE

Celosia nervosa C.C.Towns.

Status: DD

Endemism: Endemic

Distribution: Niassa, Gaza, Inhambane, Maputo

Unclear whether it is more widespread and overlooked, or genuinely with a disjunct distribution. Known from forest habitat.

ANACARDIACEAE

Lannea sp. Medonça 909

Status: DD

Endemism: Endemic

Distribution: Cabo Delgado

Known only from the type that was collected in 1942. Reported to be rare in the wild. The herbarium material is insufficient for a formal taxonomic description. The young leaves and the inflorescence are similar to *L. antiscorbutia*.

Lannea sp. Torre & Paiva 12146

Status: DD

Endemism: Endemic

Distribution: Cabo Delgado

Known only from the type that was collected in 1964. Grows at altitudes of 2,200 m. The taxon is reported to be uncommon in the wild. The taxon appears to be similar to *L. stuhlmanni*.

Rhus rehmanniana Engl. var. *longecuneata* R. & A.Fern.

Status: DD

Endemism: Endemic

Distribution: Maputo

Found on rocky hills. Last recorded in 1947. Apparently known only from the type collection.

ANNONACEAE

Palyalthia mossambicensis Vollesen

Status: DD

Endemism: Endemic

Distribution: Zambézia

Found in forests.

Uvariodesdran sp. Medonça 2558A

Status: DD

Endemism: Endemic

Distribution: Manhica

Known only from the type collection (1944). The specimen consists of immature flowers; no fruits available. Grows in the margins of riverine forest.

APOCYNACEAE

Carissa praetermissa Kupicha

Status: DD

Endemism: Endemic

Distribution: Zambézia, Gaza, Inhambane

Reported to be rare; fewer than five localities. Known from forests and woodland interfaces.

Straphanthus hypoleucas Stapf

Status: DD

Endemism: Near-endemic?

Distribution: Nampula, Zambézia

Found amongst rocks in woodland. Also in Tonzonio.

ARECACEAE

Raphia australis Oberm. & Strey

Status: DD

Endemism: Near-endemic

Distribution: Maputo

Also in South Africa (KwaZulu-Natal).

ASTERACEAE

Bathriocline morrumballae (Oliv. & Hiern) O.Hoff.

Status: DD

Endemism: Endemic

Distribution: Niassa, Zambézia

In forests. Reported to be rare and known from fewer than five localities.

Bathriocline steetziana Wild & G.V.Pope

Status: DD

Endemism: Endemic

Distribution: Niassa, Zambézia

Found amongst rocks in woodland. Reported to be rare and known from fewer than five localities.

Vernania inhacensis G.V.Pope

Status: DD

Endemism: Endemic

Distribution: Gaza, Inhambane, Maputo

Found in forests.

BALSAMINACEAE

Impatiens balsamina L.

Status: DD

Endemism: Endemic

Distribution: Niassa

Known only from one collection.

CAPPARACEAE

Maerua acuminata Oliv.

Status: DD

Endemism: Near-endemic?

Distribution: Cabo Delgado

The species is apparently known only from the type collection; suspected to also occur in Tonzonio. It is uncertain whether it was collected on the Tonzonio side or on the Mozambican side.

Maerua brunnescens Wild

Status: DD

Endemism: Endemic

Distribution: Sofala, Zambézia, Inhambane, Maputo

In low-altitude dryland, often with Acacia species.

Maerua schliebenii Gilg
Status: DD
 Endemism: Near-endemic
 Distribution: Niassa
In forests and woodlands. Also in Tonzonio.

CHENOPODIACEAE

Salsola sp. Mogg 29302
Status: DD
 Endemism: Endemic
 Threats: Habitat degradation, urban expansion, dessication
 Distribution: Inhambane
The type was collected in 1958. Suspected to be known from an additional collection. Found in a coastal, saline habitat.

CONVOLVULACEAE

Ipomoea consimilis Schulze-Menz
Status: DD
 Endemism: Endemic
 Distribution: Manhica e Sofala
In forests and bushland habitats. Also in Tonzonio.

Ipomoea ephemera Verdc.
Status: DD
 Endemism: Endemic
 Distribution: Nampula, Zambèzia
Not known elsewhere. Found in bushland and ponds, in dampish soil.

CRASSULACEAE

Crassula swaziensis Schonland var. *guruensis*
R.Fern.
Status: DD
 Endemism: Near-endemic
 Distribution: Zambèzia, Nampula
In South Africa and Swaziland. Collected near rivers at 1,600 m.

CUCURBITACEAE

Coccinia fernandesiana C.Jeffrey
Status: DD
 Endemism: Near-endemic
 Distribution: Nampula, Zambèzia
Found in forests, woodlands and thicket habitats. Also in Tonzonio.

Eureiandra sp. R.Fern. & Perreira 242
Status: DD
 Endemism: Endemic
 Distribution: Inhambane
Known only from a single specimen collected in 1968. The specimen is sterile and in poor condition.

Momordica henriquesii Cogn.
Status: DD
 Endemism: Near-endemic
 Distribution: Niassa
In forest and Brachystegia woodland. Also in Tonzonio.

Momordica sp. Torre & Paiva 9867
Status: DD
 Endemism: Endemic
 Distribution: Niassa
Known only from the type collection (1964). In Brachystegia woodland at altitudes of 280 m.

Peponium sp. Torre 5578
Status: DD
 Endemism: Endemic
 Distribution: Zambèzia, Tete
Known only from two collections (Torre 5578 collected in 1934 and Perreira, Sormanto & Marques 1720 collected in 1966). In moist grassland at 1,380–1,420 m.

CYCADACEAE

Cycas thouarsii Gaudich.
Status: DD
 Distribution: Zambèzia
Associated with the Zombezi Valley and coastline.

DICHAPETALACEAE

Dichapetalum deflexum (Klotzsch) Engl.
Status: DD
 Endemism: Near-endemic
 Distribution: Niassa, Manhica e Sofala
In bushland. Also in Tonzonio.

Dichapetalum edule Engl.
Status: DD
 Endemism: Near-endemic
 Distribution: Niassa
In forests and thickets. Also in Tonzonio.

Dichapetalum macrocarpum N.Krause
Status: DD
 Endemism: Near-endemic
 Distribution: Nampula
In Brachystegia woodland, bushland and thicket. Also in Tonzonio.

EBENACEAE

Diospyros inhacaensis F.White
Status: DD
 Endemism: Near-endemic
 Distribution: Gaza, Inhambane, Maputo
In forests. Extends into KwaZulu-Natal (South Africa).

Diospyros sp. Torre, Correia & Ladeira 18965
Status: DD
 Endemism: Endemic
 Distribution: Tete
Known from a single specimen that was collected in 1973. Found in rocky places, on slopes at 867 m.

ERIOCAULACEAE

Eriocaulon infaustum N.E.Br.
Status: DD
 Endemism: Endemic
 Distribution: Manhica, Sofala
Found in rice fields. It is probably extremely common yet little known.

Mesanthemum africanum Moldenke
Status: DD
 Endemism: Near-endemic?
 Distribution: Manhica
Chimonimoni endemic. Possibly also in Zimbabwe?

ERYTHROXYLACEAE

Nectaropetalum carvalhoi Engl.
Status: DD
 Endemism: Endemic
 Distribution: Nampula
Found in forests.

EUPHORBIACEAE

Acalypha sp. Torre & Correia 14410
Status: DD
 Endemism: Endemic
 Distribution: Zambèzia
Known only from this collection (1966). It is found in secondary forest consisting of Brachystegia boehmii, Julbernardia globiflora, Albizia adianthifolia and Milletia stuhlmanii on sandy clay soil. Altitude 40 m.

Croton kilwa Radcl.-Sm.
Status: DD
 Endemism: Near-endemic
 Distribution: Nampula
Found in forests. Also in Tonzonio.

Euphorbia clavigera N.E.Br
Status: DD
 Distribution: Maputo
Known from a number of localities in Maputo Province. Also in South Africa and Swaziland. Associated with the Lebombo Mountains.

Euphorbia graniticola L.C.Leach
Status: DD
 Distribution: Manhica

Jatropha latifolia Pax var. *subglandulosa* Radcl.-Sm.
Status: DD
 Endemism: Endemic
 Distribution: Maputo
It was collected in 1948 and is known only from a single collection. It is found in wooded grassland.

Jatropha subaequiloba Radcl.-Sm.
Status: DD
 Endemism: Endemic
 Distribution: Inhambane
Found in swamps and woodlands.

Monadenium torrei L.C.Leach
Status: DD
 Endemism: Near-endemic
 Distribution: Nampula
In woodland amongst rocks. Also in Tonzonio.

Phyllanthus medoncae J.F.Brunel & Radcl.-Sm.
Status: DD
 Endemism: Endemic
 Distribution: Manhica e Sofala
Found in grassland.

Tragia glabrata (Mull.Arg.) Pax & K.Hoffm. var. *hispida* Radcl.-Sm.
Status: DD
 Endemism: Endemic
 Distribution: Maputo
It is not known from elsewhere. It is known from dry open bushland. Collected in 1940.

Tragia shirensis Prain var. *glabriuscula* Radcl.-Sm.
Status: DD
 Endemism: Endemic
 Distribution: Nampula
It is found in dry bushland. It is known only from the type collection. This variety occurs on the eastern limit of the range of the species.

IRIDACEAE

Tritionia moggii Oberm.
Status: DD
 Endemism: Endemic
 Distribution: Gaza, Inhambane, Maputo
In woodlands near the coast.

LAMIACEAE

Acollanthus viscosus Ryding
Status: DD
 Endemism: Near-endemic
 Distribution: Manhica
Habitat unknown. Also in Zimbabwe.

Hemizygia flabellifolia S.Moore
Status: DD
 Endemism: Near-endemic
 Distribution: Manhica
Chimonimoni endemic. Also in Zimbabwe.

Plectranthus kapatensis (R.E.Fr.) J.K.Morton
Status: DD
 Endemism: Endemic?
 Distribution: Manhica
 Only known from the Chimonimonis in Mozambique.

Plectranthus psammophilus Codd
Status: DD
 Endemism: Near-endemic
 Threats: Habitat degradation, urban expansion
 Distribution: Maputo, Inhambane
 Very localised in South Africa and Mozambique. No recent collections for Mozambique.

LEGUMINOSAE: CAESALPINIOIDEAE

Berlinia orientalis Brenan
Status: DD
 Endemism: Near-endemic
 Distribution: Nampula
 Found in forest and thicket. Also in Tonzonio.

LEGUMINOSAE: MIMOSOIDEAE

Adenopodia schlechteri (Harms) Brenan
Status: DD
 Endemism: Endemic
 Distribution: Maputo, Manhica e Sofala
 In thicket.

LEGUMINOSAE: PAPILIONOIDEAE

Aeschynomene aphylla Wild
Status: DD
 Endemism: Near-endemic?
 Distribution: Manhica
 Chimonimoni endemic. Also in Zimbabwe?

Baphia macrocalyx Harms
Status: DD
 Endemism: Near-endemic
 Distribution: Nampula
 Found in a variety of habitats. Also in Tonzonio.

Indigofera fulgens Baker
Status: DD
 Endemism: Near-endemic
 Distribution: Cabo Delgado, Inhambane, Gaza, Zambézia
 The type is from Mozambique/Tonzonio in the Rovumo River oreo. Collected in 1861 by Kirk s.n. Grows in thicket and sandy soils at an altitude of 500 m. Unsure whether this species is known only from the type.

Indigofera kuntzei Harms
Status: DD
 Endemism: Near-endemic
 Distribution: Cabo Delgado, Inhambane, Gaza, Zambézia
 In grassland. Also in Tonzonio.

Milletia bussei Harms
Status: DD
 Distribution: Cabo Delgado
 Also in Tanzania.

Tephrosia aequilata Baker subsp. *namuliana*
 Brummitt
Status: DD
 Distribution: Zambézia

Tephrosia forbesii Baker subsp. *inhacensis*
 Brummitt
Status: DD
 Distribution: Inhambane, Gaza, Maputo

LOGANIACEAE

Strychnos myrtoides Gilg & Busse
Status: DD

Endemism: Near-endemic
 Distribution: Cabo Delgado
 In woodland. Also in Tonzonio.

LYTHRACEAE

Hionanthera graminea R.Fern. & Diniz
Status: DD
 Endemism: Endemic
 Threats: Urban expansion
 Distribution: Nampula
 Not recorded since 1935, could have been affected by the development of Nompulo Town. Found in swamps.

Hionanthera mossambicensis R.Fern. & Diniz
Status: DD
 Endemism: Endemic
 Threats: Urban expansion
 Distribution: Nampula
 Not recorded since 1936, could have been affected by the development of Nompulo Town. Found in swamps.

Hionanthera torrei R.Fern. & Diniz
Status: DD
 Endemism: Endemic
 Threats: Urban expansion
 Distribution: Nampula
 Not recorded since 1937, could have been affected by the development of Nompulo Town. In the soil, on rocks.

Nesaea gazensis R.Fern.
Status: DD
 Endemism: Endemic
 Distribution: Gaza
 Mud in riverbed.

MALPIGHIACEAE

Thespesiopsis mossambicensis Exell & Hillcoat
Status: DD
 Endemism: Endemic
 Distribution: Nampula
 Found in forest.

Triaspis suffulta Launert
Status: DD
 Endemism: Endemic
 Distribution: Manhica e Sofala
 Found in bushland.

MALVACEAE

Hibiscus rupicola Exell
Status: DD
 Endemism: Endemic
 Distribution: Tete
 Amongst rocks. Locality is a small oreo (mountain) in a rural setting.

MELASTOMATACEAE

Memecylon sessilicarpum A. & R.Fern.
Status: DD
 Endemism: Endemic
 Distribution: Nampula
 Common around Momo in forests.

Memecylon sousae A. & R.Fern.
Status: DD
 Endemism: Near-endemic
 Distribution: Manhica e Sofala, Maputo
 Found growing in forest, bushland and thicket. Also in Tonzonio.

Memecylon sp. Mogg 32462
Status: DD
 Endemism: Endemic
 Distribution: Nampula
 Known only from the type (1965). The specimen does

not consist of fruit or flowers. Collected near the coast.

Memecylon sp. Pedro & Pedrógão 5170
Status: DD
 Endemism: Endemic
 Distribution: Cabo Delgado
 Known only from the type (1948). The specimen is sterile.

Memecylon sp. Swynnerton 1074
Status: DD
 Endemism: Endemic
 Distribution: Manhica e Sofala
 Known only from the type that was collected in a forest (1906). The fruits of the specimen are immature. Collected at 130 m altitude. Resembles *M. sousae* but the leaves are smaller and glossier.

Memecylon torrei A. & R.Fern.
Status: DD
 Endemism: Endemic
 Distribution: Nampula
 Found in a coastal oreo on territorio.

MENISPERMACEAE

Tinospora mossambicensis Engl.
Status: DD
 Endemism: Near-endemic
 Grows in forest. Also in Tonzonio.

MORACEAE

Ficus muelleriana C.C.Berg
Status: DD
 Endemism: Endemic
 Threats: Urban expansion, agriculture
 Distribution: Manhica
 Known only from two localities in Mozambique; surrounding habitat is miombo (Uapaca and Brachystegia microphylla). Found on hilltops and slopes in sandy looms. The species is a climbing, scrambling fig. Also in Zimbabwe.

Ficus scasselatii Pamp.
Status: DD
 Threats: Habitat degradation
 Distribution: Sofala, Zambézia
 Also known from Zimbabwe, Malawi, Kenya, Tonzonio and further afield. Possibly more widely distributed in Mozambique than in Zimbabwe. Mid-altitude, mixed semi-evergreen forest. Altitude of 1,000–1,850 m.

MYRTACEAE

Eugenia sp. Wild, Goldsmith & Müller 6646
Status: DD
 Endemism: Near-endemic
 Distribution: Manhica e Sofala
 15 m tall tree. Endemic to Horoni–Mokurupini near the Mozambique–Zimbabwe border. Grows in forest habitats. Also in Zimbabwe.

OLEACEAE

Jasminium sp. Torre 4438
Status: DD
 Endemism: Endemic
 Distribution: Zambézia
 Known only from a single specimen (1942). Found in dense scrub on river margins.

Olea chimanimani Kupicha
Status: DD
 Endemism: Near-endemic
 Distribution: Manhica
 Also recorded from Zimbabwe. The only specimen for Mozambique is by Dutton 77 (1973) from the Chimanimonis. Known from scrub vegetation in quartzite cracks.

ORCHIDACEAE

Cyrtorchis glaucifolia Summerh.

Status: DD

Endemism: Endemic

Distribution: Nampula

Known only from Mozambique. Two specimens are cited, and this species is known only from Nampula Province in the vicinity of Ribôué. It is epiphytic on Xerophyta, and found at an altitude of 500 m.

Disperis mozambicensis Schltr.

Status: DD

Endemism: Endemic

Threats: Urban expansion

Distribution: Sofala

The type is from the Pungwe River, collected in 1895 (Schlechter s.n.). Known only from the type collection. It is stated that the species is endemic. It was found growing amongst bushes on the riverbank.

Eulophia biloba Schltr.

Status: DD

Endemism: Endemic

Threats: Urban expansion

Distribution: Sofala

The type was collected in 1895 (Schlechter s.n.) Collected at 7 m above sea level. The species is known only from this gathering. It was found in coastal vegetation. It is known only from a photograph at Kew as the holotype was destroyed in Berlin.

Eulophia bisaccata Kraenzl.

Status: DD

Endemism: Endemic

This species is known only from the description, which lacks a drawing or an exact locality. Known only from the type specimen and collected by Junod. No other information available.

Eulophia petersii Reichb.f.

Status: DD

Distribution: Tete

Occurring mainly in sandy areas and in swamps during rainy seasons.

Habenaria hirsutissima Summerh.

Status: DD

Endemism: Endemic

Distribution: Manhica

The type was collected 10 km from Mutuoli by Gomes & Sauso, on the Mutuoli-Malemo Road in 1954. The species is known only from this collection.

Habenaria mossambicensis Schltr.

Status: DD

Endemism: Endemic

Threats: Urban expansion

Distribution: Inhambane

The type was collected 16 km from Beira in 1895. The holotype was destroyed in Berlin. It is not known from elsewhere.

Liparis hemipiloides Schltr.

Status: DD

Endemism: Endemic

Threats: Urban expansion

Distribution: Inhambane

The type was collected in 1898 from the Mozambique Company area at 25 Mile Station, in "primeval" forest at Danda at 30 m. This species is incompletely known. The holotype was destroyed in Berlin.

POACEAE

Brachiaria sp. Ellis 6094

Status: DD

Distribution: Maputo

Also in South Africa and Swaziland.

Enneapogon sp. Ellis 5500

Status: DD

Distribution: Gaza

Occurs only on limestone in the Pofuri region (South Africa) and probably in the adjoining area of Mozambique. The genus is under revision.

Eragrostis sericata Cope

Status: DD

Endemism: Endemic

Distribution: Gaza/Inhambane, Niassa

The type was collected by Gomes and Sousa (1939) at an altitude of 30–100 m. Known from fewer than five collections. Not known from collections older than the 1930s. Found in sandy ground in dry forest. Distinctive densely, silky-villous basal leaf sheaths.

PODOCARPACEAE

Podocarpus falcatus (Thunb.) R.Br. ex Mirb.

Status: DD

Distribution: Gaza, Maputo

Southern Mozambique—Moputo River. Common names are 'msongo', 'mulotchen', 'um-koba'. Dioecious.

Widespread in the Western Cape forests (South Africa).

This species is overutilised throughout its range. It is protected in the Maputo river areas. However, it is rare in Mozambique. Found in gallery forests.

POLYGALACEAE

Polygala limae Exell

Status: DD

Endemism: Endemic

Distribution: Cabo Delgado

The type only is known.

Polygala torrei Exell

Status: DD

Endemism: Endemic

Distribution: Maputo

It is a perennial herb of dry pasture grass in dry open bush. Could be a weed?

RESTIONACEAE

Restio quartziticola H.P.Linder

Status: DD

Endemism: Near-endemic

Distribution: Manhica

Also in Zimbabwe.

RHAMNACEAE

Ziziphus pubescens Oliv. subsp. *glabra*

R.B.Drumm.

Status: DD

Distribution: Gaza

This is a shrub or small tree up to 4 m tall. It is said to be rare.

RUBIACEAE

Buchnera namuliensis Skan

Status: DD

Endemism: Endemic

Distribution: Manhica e Sofala, Zambézia

In swamps.

Canthium racemosum S.Moore

Status: DD

Distribution: Cabo Delgado

Also in Tanzania.

Coffea zanguebariae Lour.

Status: DD

Distribution: Niassa, Manhica e Sofala, Nampula

Also in Tanzania and eastern Zimbabwe.

Cuviera schliebenii Verdc.

Status: DD

Endemism: Near-endemic

Distribution: Nampula, Zambézia

In forests. Also in Tonzonio.

Cuviera tomentosa Verdc.

Status: DD

Endemism: Near-endemic

Distribution: Cabo Delgado

Also in Tonzonio.

Oldenlandia sp. Torre & Correia 17482

Status: DD

Endemism: Endemic

Distribution: Cabo Delgado

In soil over rocks. Found growing with Entada.

Pavetta catophylla K.Schum.

Status: DD

Endemism: Endemic

Distribution: Manhica e Sofala, Maputo

Found in forests.

Pavetta gracillima S.Moore

Status: DD

Endemism: Endemic

Distribution: Manhica e Sofala, Maputo

In forests.

Pavetta incana Klotzsch

Status: DD

Endemism: Endemic

Distribution: Manhica e Sofala

In forests.

Pavetta klotzschiana K.Schum.

Status: DD

Endemism: Endemic

Possibly found in forests.

Pavetta mocambicensis Bremek.

Status: DD

Endemism: Endemic?

Distribution: Nampula

Likely to be on the mainland (Nampula).

Pavetta pumila N.E.Br.

Status: DD

Endemism: Endemic

Distribution: Manhica e Sofala

Possibly found in forests.

Pavetta revoluta Hochst

Status: DD

Endemism: Endemic

Distribution: Manhica e Sofala, Maputo

Possibly found in forests.

Pavetta tendaguruensis Bremek.

Status: DD

Endemism: Near-endemic

Distribution: Nampula

In forests and grasslands. Known from four localities.

Also in Tanzania.

Pseudomussaenda mozambicensis Verdc.

Status: DD

Endemism: Endemic

Distribution: Nampula

Collected amongst rocks. Known only from single locality.

Psychotria sp. Balsinhas 1376

Status: DD

Endemism: Endemic

Distribution: Inhambane

Known only from the type (1968). Found in littoral dunes.

Psydrax micans (Bullock) Bridson

Status: DD

Distribution: Cabo Delgado

Also known from Tanzania.

***Psydrax moggii* Bridson**

Status: DD

Endemism: Endemic

Found in swamps and forests. No other information available.

***Spermacoce schlechteri* K.Schum.**

Status: DD

Endemism: Endemic?

Distribution: Nampula, Inhambane, Zambézia

There is a specimen from Tanzania with which it may be conspecific.

***Triainolepis sancta* Verdc.**

Status: DD

Endemism: Endemic

Distribution: Manhica e Safala

In woodlands and thicket.

RUTACEAE

***Teclea crenulata* (Engl.) Engl.**

Status: DD

Endemism: Endemic

Known only from a single collection (Stuhlmann 562).

***Vepris allenii* Comm. ex. A.Juss.**

Status: DD

Distribution: Niassa

It is recorded from the hills. It is known only from the north of Mozambique and possibly the old Tanganyika area. The species is known from dry deciduous forests, and has a very narrow distribution. Record by Daw 68 (1912) is possibly the only collection.

SAPINDACEAE

***Allophylus chirindensis* Baker f.**

Status: DD

Distribution: Manhica

Also in Zimbabwe. 15 m tall tree with a silver-grey bark. In medium-altitude evergreen forest.

SCROPHULARIACEAE

***Striga diversifolia* P.Lima**

Status: DD

Endemism: Endemic

Distribution: Nampula

Known only from a single locality.

SOLANACEAE

***Solanum litoraneum* A.E.Gonc.**

Status: DD

Distribution: Inhambane

The type is from Inhaca (Maputa) by Magg 27597 (1957). The shrub is 0.2–1.0 m tall. Grows in littoral vegetation of dunes, in thickets or margins of dense bushland and bushes beside the seashore. Known from many collections.

STERCULIACEAE

***Cola discoglypsemnophylla* Brenan & Jones**

Status: DD

Endemism: Near-endemic

Distribution: Nampula

In forests. Known from fewer than five localities. Also in Tanzania.

***Hermannia micropetala* Harv.**

Status: DD

Endemism: Endemic

Distribution: Manhica e Safala, Gaza, Inhambane, Maputa

Habitat unknown.

TILIACEAE

***Grewia conocarpa* K.Schum.**

Status: DD

Endemism: Near-endemic

Distribution: Niassa

Coastal districts, either in thickets or in forest patches; collected along the Tanzanian border.

***Grewia hornbyi* Wild**

Status: DD

Endemism: Endemic

Distribution: Manhica e Safala, Maputa

In woodland.

***Grewia limae* Wild**

Status: DD

Endemism: Near-endemic?

Distribution: Caba Delgada

Small tree of coastal woodlands. Possibly also in Tanzania.

VITACEAE

***Cyphostemma amplexum* (Baker) Descouings**

Status: DD

Endemism: Near-endemic

Distribution: Nampula

Altitude of 50 m. Also recorded in Tanzania.

GENTIANACEAE

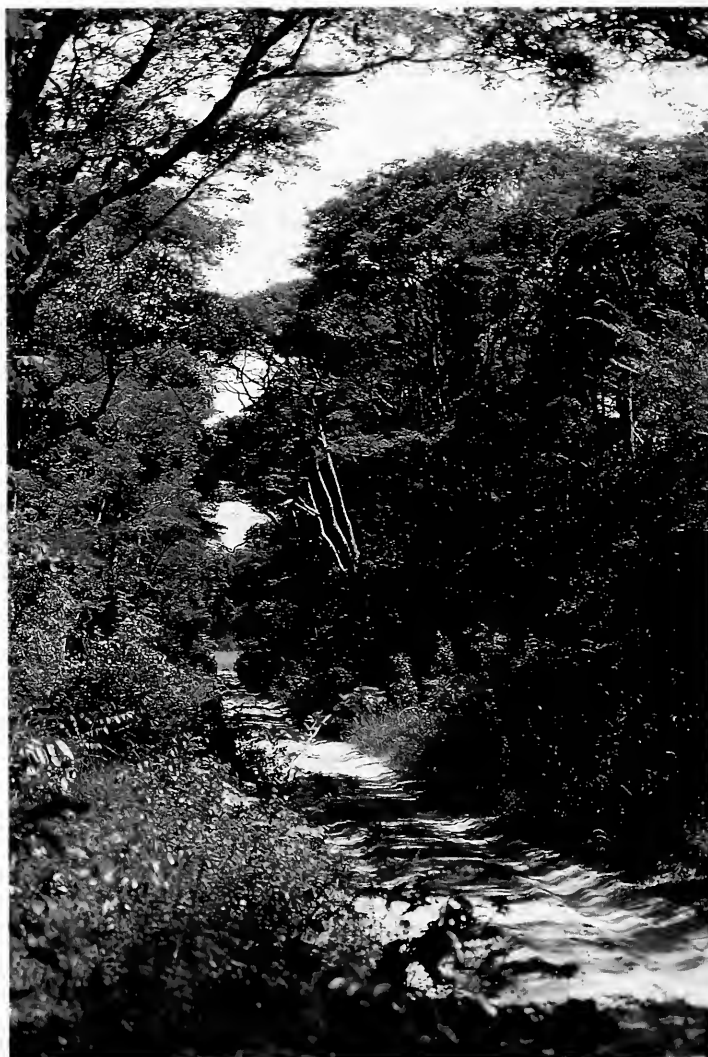
***Farao involucrata* (Klotzsch) Knoblauch**

Status: no status

Endemism: Endemic

Distribution: Nampula, Zambézia

Found growing amongst rocks.



Inhambitanga Forest, Mozambique. (Photo: J. Burrows)



Patricia Craven* & Sonja Loots*

Introduction

The Red List status of some Namibian plants has been presented in five previous publications (Table 1) and the preliminary Red List presented here is an attempt to integrate existing and new data to form a basis on which to build the Threatened Plants Programme of the National Botanical Research Institute (NBRI). The Checklist of Namibian Plant Species (Craven 1999, 2000a, b) provided the nomenclatural and taxonomic framework, and much of the information used in the new Red List was accumulated during its compilation. Endemic taxa and those previously listed were assessed first, but the Red List excludes some priority taxa owing to time constraints. It is, however, the aim of NBRI to continue the RDL process and publish a more comprehensive list by the end of 2002.

Methods

Information dossiers for RDL plants, compiled over the past few years at WIND, were used as a starting point for the list; these dossiers include illustrations, maps based on georeferenced herbarium specimens, literature references, and notes (for example, look-alike plants, uses, and so forth). Specimen label information from herbarium holdings in the Spmndb (WIND) and PRECIS (PRE) databases was added; data from voucher specimens (for exam-

ple, of habitat and frequency) were also taken into consideration. In a few cases, herbarium staff verified specimen identifications. Field trips were organised to search for certain taxa and some assessments were based on this work; field assessment sheets were completed and added to the dossiers for future evaluations.

Only spermatophytes were evaluated because the taxonomy and distribution of lower plants are still poorly known. As this is an ongoing project in Namibia, a certain degree of caution was exercised when doing the assessments. Although the *Data Deficient* (DD) category was often applied to indicate inadequate threat information, it was also applied to taxonomically poorly known Namibian taxa. A taxon was always evaluated as DD when no voucher specimens could be traced, and DD was also applied in the following cases:

- Known from type or a very limited number of specimens only
- Taxonomically uncertain
- Known from one specimen in Namibia, but widespread or well-known elsewhere
- Not yet confirmed to occur in Namibia, or notes regarding distribution are unclear
- Taxon under revision

This approach was adopted to identify gaps and important areas needing research, especially fieldwork. The VU D2 (*Vulnerable*)

Capital: Windhoek, largest city, Walvis Bay, main port

Area: 824,268 km²

Languages: English (official), Afrikaans, German, Ju/'hoan, Khoekhoegowab (Nama/Damara), Oshidonga, Oshikwanyama, Otjiherero, Rucgiriku, Rukwangali, Setswana, Silozi, Thimbukushu

Currency: Namibian dollar (N\$), on a par with South African Rand

Total indigenous spermatophyte taxa: 3,961

Total endemic spermatophyte taxa: 602

Total indigenous moss and fern taxa: 161

Total RDL plants: 1,152

Focal RDL institutions: NBRI, which includes WIND and NPGRC

Number of Protected Areas: 21 parks and nature reserves, one Transfrontier Park (Botswana-Namibia-South Africa), and several other formally protected areas.

Population: 1,701,330 **Growth Rate:** 3.1% **Density:** 2.3 people/km²

Phytogeography: The Zambeian regional centre of endemism is in the northeast, the Kalahari-Highveld Transition Zone, and the Karoo-Namib regional centre of endemism in the southwest.

Flora: Dry woodland in the northeast, becoming drier towards the south and the coast, through bushland and wooded grassland to desert. The escarpment forms a transition between the coastal desert and the savannas of the interior.

Sources: Anonymous 2000, Craven 1999, Giess 1971, Maggs 1998, Maggs, Kolberg & Hines 1994, Maho 1998, White 1983

Table 1. RDL status of Namibian plants in previous publications.

Publication	Number of Namibian taxa evaluated	Comments
Hall <i>et al.</i> 1980	56	
Hilton-Taylor 1996a	385	Information provided by WIND
Hilton-Taylor 1997	14	Information provided by WIND
Walter & Gillett 1998	77	Assessments not based on Hilton-Taylor (1996a, 1997) are questionable
Oldfield <i>et al.</i> 1998	11	Only four assessments completed with Namibian input

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category was used when the plant was known from the type specimen only, unless it was taxonomically uncertain, in which case it was considered DD.

Because Namibia's conservation legislation is under review and changes are expected, no information was provided on whether a plant occurs within a protected area or is currently protected.

Results and Discussion

A total of 1,152 spermatophyte taxa was assessed (Table 2). We have not compared trends indicated by this assessment with those of previous publications, because the 1994 IUCN categories differ so significantly from the previous categories. The knowledge base of Namibian taxa has also been enlarged significantly since Hilton-Taylor (1996a). The major threats to the survival of Namibia's plants—mining and collection of specific plants—are also now better known.

Red List Assessments

The two taxa previously listed as being extinct in Namibia were re-evaluated as DD. Sterile material was collected of what appears to be *Protea gaguedi*, indicating that an assessment can only be made after further field work has been conducted. The other taxon, *Conophytum ricardianum* subsp. *rubiflorum*, also requires fieldwork, as it occurs in a remote area that is not regularly visited. We strongly recommend that although the DD category is used to indicate that no assessment has been made as yet, all taxa categorised as DD should not be treated as if they are unimportant; they should be given the same degree of protection as threatened taxa until such time that more information becomes available to make an assessment.

In addition, the following genera were considered DD, as they are either under revision, on loan from WIND, or awaiting publication: *Lycium*, *Orbea* and other stapeliads, *Geigeria*, *Othonna*, *Albuca*, and numerous monocotyledonous taxa on loan to the herbarium in Hamburg (H). Genera that need taxonomic revision and were therefore not assessed include *Crinum*, *Salsola*, and *Aptosimum*, as well as numerous Mesembryanthemaceae.

Species that were included in previous RDL assessments for Namibia, but were subsequently found not to occur in Namibia or that are now synonyms are *Eulophia lolubii*, *Calliandra redacta*, *Manulea leptosiphon*, and *Orbeopsis tsunkebensis*.

On the whole, there were insufficient data on generation cohorts and population decline for Criterion A to have been used with confidence, even when inferred or suspected. This criterion was used for only three taxa in the *Critically Endangered* (CR) and *Endangered* (EN) categories. There are, however, numerous taxa known from a limited number of individuals or with a restricted area of occupancy, and in cases such as these, Criterion D was used extensively, particularly under the VU category. The other most commonly used criterion was Criterion B, as data on the number of locations or suspected population decline are more readily available.

Criteria used in the 1994 IUCN assessments are clearly quantitative and such data are usually not yet available in Namibia. Based on experience from elsewhere in southern Africa, inferred or suspected population decline (uncertainty) was therefore applied to taxa that occur in particularly sensitive areas, such as the Sperrgebiet. For example, experts who investigated the impact of the Lesotho Highlands Water Project (LHWP) on the flora were of the opinion

that the LHWP would not directly threaten the status of any of the vulnerable species. Field experience, however, showed that increased accessibility to remote areas results in removal of plants known to have sale value, even when they are not directly affected by construction work (Talukdar 1994). The Sperrgebiet, with its unique flora of generally high conservation value, is under increasing pressure as the area is being opened up to mining developments and tourism. Numerous taxa not directly affected by existing (or proposed) mining projects were therefore considered threatened in this RDL compilation, based on suspected patterns of threat. By listing taxa such as these, we hope that the case for these areas to be conserved will be strengthened.

It often appears as if not all RDL species need a management programme for their protection. Taxa that are endemic to, for example, the Brandberg massif, appear to be well out of reach of most destructive mechanisms and, despite having limited distribution ranges, populations are likely to remain stable there. Recent ecotourism and research interests on the Brandberg (aided by helicopter deliveries of water) have, however, resulted in abnormally large numbers of people near the summit. The perception that Brandberg endemics are safe from disturbance is thus altered and these species may now require some sort of management programme for their protection. This sort of phenomenon is particularly important in an arid environment where plants are not apparent during dry periods, resulting in accidental destruction (Table 3).

Application of the Red Data List

This Red Data List is far from complete. The aims of the Namibian Threatened Plants Programme are to:

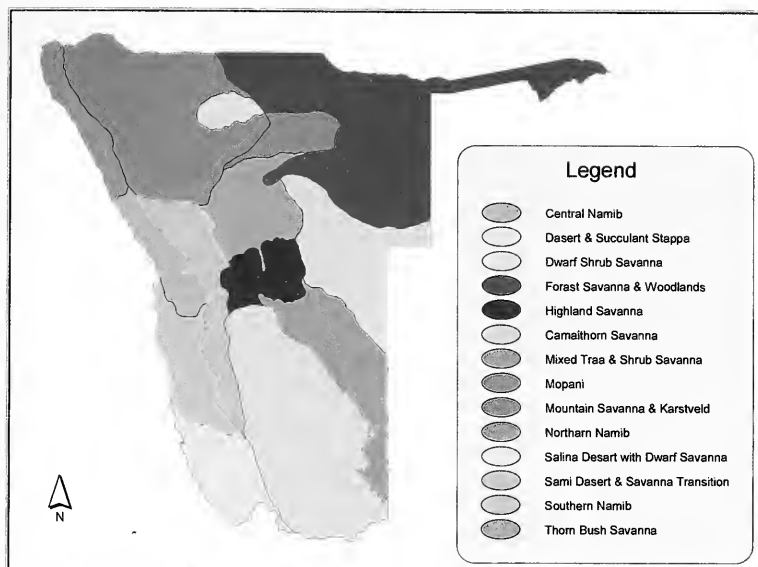
- Prioritise plant taxa that require conservation
- Centralise any information emanating from research or monitoring
- Co-ordinate mechanisms that will make this information available
- Assist in developing appropriate conservation strategies

Table 3. Endemism amongst taxa on the Namibian RDL.

Endemism	Number of taxa
Confirmed endemic	417
Suspected endemic	16
Confirmed near-endemic	275
TOTAL	708

Table 2. Results of the RDL assessments for Namibia.

Category	Number of taxa
Spermatophyte taxa in Namibia	3,961
Taxa on the RDL (EX, ExW, CR, EN, VU, LR-nt, LR-lc & DD)	1,152
Critically Endangered (CR)	8
Endangered (EN)	80
Vulnerable (VU)	199
Lower-Risk near threatened (LR-nt)	84
Lower-Risk least concern (LR-lc)	516
Data Deficient (DD)	265
Endemics with RDL assessment	433
Endemics that are EX, ExW, CR, EN & VU	179
Taxa known from one specimen only	>45



Vegetation map of Namibia.

These goals will be achieved by, in the first place, maintaining a basic store of information, that is, a databank of standardised information with dossiers on priority species indicating monitoring or research needs, as well as distribution maps, descriptions, and names of all interested parties and their fields of expertise. Second, taxonomic or field research will be promoted and carried out where possible, and information required for assessments will be sought. In order to optimise limited research resources—both human and financial—a strategy needs to be developed for evaluating and prioritising botanical projects and programmes. The RDL assessments may be used as a criterion for prioritisation. Complementary conservation strategies in support of *in situ* conservation, like *ex situ* seed banking, will also be more effective if there is a uniform strategy and defined targets.

During the compilation of this list, taxonomists from all over the world were very helpful and knowledgeable. By contrast, collaboration with specialists in other fields—such as conservationists, ecologists and interested laypersons—has been limited, owing to issues relating to correct taxonomic identification. All attempts must be made to encourage collection of voucher specimens with detailed notes, so that the plants concerned can be correctly identified. Few, if any, non-taxonomists can identify the rarer Namibian taxa, especially those that occur sporadically (a common feature of dry areas). The Namibian RDL process has also encouraged collaboration

with other regional scientists in order to carry out global assessments of cross-border species. In addition, the programme endeavours to contribute to public awareness and environmental education on threatened plants in Namibia, which to date has been insufficient.

One example of the value of the current Red List initiative is illustrated by *Aloe pillansii*. Field work undertaken to establish its conservation status revealed that although the total number of plants was found to be higher than previously thought, the population is definitely declining. Mining activity is the major threat and the low levels of recruitment observed could not be fully explained. This has highlighted the need for further investigation and for urgent communication and action so that the populations can be conserved and monitored (Loots & Mannheimer, in press).

Meanwhile, new legislation on conservation (The Parks and Wildlife Management Bill 2001), which includes plants, has been drafted for Namibia. In this legislation, provision will be made for specially protected plants. Plants with a high conservation status, especially endemic plants that are classified as *Critically Endangered*, may in future be automatically added to this list. Unfortunately, the enforcement of this legislation may remain problematic as the responsible authority is severely understaffed.

Although Namibia's Environmental Assessment Policy is still regarded by some as insufficiently legally binding, numerous proposed development projects are following

the guidelines contained in the policy. This is indicated by various enquiries received by NBRI as to which plants are considered threatened. In order to cater for requests such as these, this Red List also incorporates numerous taxa categorised as LR-lc for the benefit of local conservationists and policymakers.

Conclusion

With the National Development Plan II of Namibia and especially Vision 2030, rapid development in all sectors is envisaged in an attempt to improve the socio-economic conditions of all citizens. As a result, increased industry and burgeoning urbanisation are anticipated. Namibia's plant resources may therefore become increasingly threatened, and those that have already been assessed as CR, EN, or VU will be most at risk. These taxa will have to be closely monitored to prevent their extinction. Already, the financial implications of conservation are high and resources to undertake *in situ* conservation are continuously declining. There is therefore an urgent need to prioritise the taxa that must be conserved and to increase the knowledge base surrounding these taxa.

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Adenia pechuelii, categorised as **Endangered**. (Photo: H. Kolberg)

EXTINCT & THREATENED

ACANTHACEAE

Hygraphila gracillima (Schinz) Burkill

Status: VU B1B2cdC2aD1

Endemism: Endemic

Threats: Habitat degradation

Distribution: North

Its decline is due to pons drying up and over-use of water resources in the north.

Manechma seratinum P.G.Mey.

Status: VU D2

Endemism: Endemic

Threats: Habitat degradation

Distribution: North-West

Known from the type only.

Phaulopsis semiconica P.G.Mey.

Status: VU D2

Endemism: Near-endemic

Distribution: North-West

Ruellia currorii T.Andersan

Status: VU D2

Threats: Habitat degradation

Distribution: North-West

AMARYLLIDACEAE

Brunsvigia herrei Leight. ex W.F.Barker

Status: VU D2

Endemism: Near-endemic

Threats: Mining

Distribution: South-West

Known from one collection only.

Crinum paludosum I.Verd.

Status: VU D2

Endemism: Endemic

Distribution: South-Central

Haemanthus avasmanthus Dinter

Status: VU D2

Endemism: Endemic

Threats: Mining

Distribution: Central

Known from type specimens only, but is very distinct.

Grows on steep south-facing micaceous schist ledges.

Namaquanula bruce-bayeri D. & U.Müll.-Doblies

Status: VU D2

Endemism: Near-endemic

Threats: Mining

Distribution: South-West

Strumaria barbarae Oberm.

Status: VU D2

Endemism: Near-endemic

Threats: Collection

Distribution: South-West

Known from two forms only.

Strumaria bidentata Schinz

Status: EN B1B2c

Endemism: Near-endemic

Threats: Mining, collection

Distribution: South-West

Diminutive and can be confused with *S. hardyana* (vegetatively). Grows in sand on exposed flats and amongst rocks.

Strumaria hardyana D. & U.Müll.-Doblies

Status: EN B1B2cdD1

Endemism: Endemic

Threats: Mining, collection

Distribution: South-West

Can be confused in the vegetative state with *S. bidentata*.

Strumaria phanalthica Dinter

Status: VU D2

Endemism: Endemic

Threats: Mining

Distribution: South-West

Occurs on wide ledges of steep south-facing slopes, benefits from fog. The species is in cultivation and has the largest flowers of the genus.

ANACARDIACEAE

Ozora namaquensis (Sprague) Von Teichman &

A.E.van Wyk

Status: VU D2

Endemism: Near-endemic

Threats: Mining

Distribution: South-East

APIACEAE

Marlathiella gummifera H.Walff

Status: VU D2

Endemism: Endemic

Threats: Mining and prospecting

Distribution: South-West

Dwarf shrub that grows along coast, Nomibion endemic genus.

APOCYNACEAE

Baynesia laphaphara Bruyns

Status: CR B1B2eC2b

Endemism: Endemic

Threats: Collection

Distribution: North-West

Known from one locality only.

Brachystelma schinzii (K.Schum.) N.E.Br.

Status: VU D2

Endemism: Endemic

Threats: Harvesting

Distribution: North-East

May be undercollected, but is utilised.

Brachystelma schultzei (Schltr.) Bruyns

Status: VU D2

Endemism: Endemic

Threats: Grazing/browsing, collection

Distribution: Central

The plant grows in open places amongst scattered grass clumps where it is inconspicuous, unless in flower. May be undercollected.

Caralluma peschii Nel

Status: VU D1

Endemism: Endemic

Threats: Grazing/browsing, collection

Distribution: North-West

Ceropegia dinteri Schltr.

Status: VU D1

Endemism: Endemic

Threats: Collection

Distribution: North-West

Inconspicuous species, may be undercollected.

Cerapegia filiformis (Burch.) Schltr.

Status: VU D2

Threats: Collection

Distribution: South-East

Remarkable case of vicariance. Extremely inconspicuous, but the flowers are striking.

Cerapegia mafekingensis (N.E.Br.) R.A.Dyer

Status: VU D2

Threats: Collection

Distribution: wide

Only collected a few times.

Ceropegia pachystelma Schltr.

Status: VU D1D2

Threats: Collection

Distribution: East-Central

Usually grows in deep soil with no evidence of rockiness. Occurs in a limited area. Flowers profusely and is easy to cultivate.

Ceropegia paricyma N.E.Br.

Status: VU D2

Threats: Habitat degradation, collection

Occurs on an island in the Zombezi River; little known, probably because it is fairly insignificant.

Ceropegia stenantha K.Schum.

Status: VU B1B2cdD1D2

Threats: Habitat degradation, collection

Distribution: North-East

Wetland species.

Gamphocarpus glaucophyllus Schltr.

Status: VU D2

Endemism: Endemic?

Distribution: North-East

Only one specimen collected in 1955.

Haadia alstonii (N.E.Br.) Plawes

Status: VU D2

Endemism: Near-endemic

Threats: Mining, collection

Distribution: South-West

Hoodia juttae Dinter

Status: VU D2

Endemism: Endemic

Threats: Grazing/browsing, collection

Distribution: South-East

It looks like *H. gordonii* without flowers and occurs with it, but no hybrids or intermediates occur.

Hoodia affinalis (N.E.Br.) Plawes subsp.

delaetiana (Dinter) Bruyns

Status: EN B1B2bc

Endemism: Endemic

Threats: Mining, collection

Distribution: South-West

Winter-rainfall species.

Hoodia pedicellata (Schinz) Plawes

Status: VU D1

Endemism: Near-endemic

Threats: Collection

Distribution: North-West-Central, North-West

Hoodia ruschii Dinter

Status: VU D1D2

Endemism: Endemic

Threats: Collection

Distribution: South-Central

Full of flowers in cultivation, so probably sought after, but has a dreadful smell.

Haadia triebneri (Nel) Bruyns

Status: VU D2

Endemism: Endemic

Threats: Grazing/browsing, collection

Distribution: Central

Very unusual.

Huernia hallii E. & B.M.Lamb

Status: VU D2

Endemism: Endemic

Threats: Collection

Distribution: South-West, South-East

Grows inside *Pentzia* bushes on flat-topped mountains in stony areas, so could be overlooked.

Huernia plowesii* L.C.Leach*Status: EN B1B2e**

Endemism: Endemic

Threats: Collection

Distribution: South-Central

*Known mainly from plants in cultivation. On one farm they are scattered, but found in several places.****Lavrania haagnerae* Plowes****Status: EN B1B2eC2a**

Endemism: Endemic

Threats: Collection

Distribution: North-West

*Known from two localities only, on vertical dolomite cliffs. Additional localities may exist. Unusual features and habit for the genus make it attractive to collectors.****Lavrania perlata* (Dinter) Bruyns****Status: VU D2**

Endemism: Near-endemic

Threats: Collection

Distribution: South-West

*Known from very few collections in Namibia and from one locality, in cultivation.****Lavrania picta* (N.E.Br.) Bruyns subsp.*****parvipunctata* Bruyns****Status: VU D2**

Endemism: Endemic

Threats: Collection

Distribution: South-Central

Microlooma poicilantherum* H.E.Huber*Status: VU D2**

Endemism: Near-endemic

Distribution: South-West

Quaqua acutiloba* (N.E.Br.) Bruyns*Status: VU D2**

Threats: Mining, collection

Distribution: South-West

Quaqua incarnata* (L.f.) Bruyns subsp.**hottentotorum* (N.E.Br.) Bruyns****Status: VU C2a**

Threats: Mining, collection

Distribution: South-West

Quaqua pruinosa* (Masson) Bruyns*Status: EN B1B2cdeC2a**

Endemism: Near-endemic

Threats: Habitat degradation, urban expansion, collection

Stapelia pearsonii* N.E.Br.*Status: VU D2**

Endemism: Endemic

Threats: Collection

Distribution: South-East

Stapeliopsis neronis* Pillans*Status: EN B1B2ce**

Endemism: Near-endemic

Threats: Collection, habitat degradation

Distribution: South-West

Known from one collection only; on lower mountain slopes near riverbank.

APONOGETONACEAE

Aponogeton azureus* H.Bruggen*Status: VU D2**

Endemism: Endemic

Threats: Grazing/browsing, urban expansion

Distribution: North-West

Known from type only, collected in 1974 (very good rain year). Tubers of similar toxic are eaten.

ASPHODELACEAE

Aloe argenteicauda* Merxm. & Giess*Status: VU B1B2e C2a**

Endemism: Endemic

Threats: Collection

Distribution: South-Central

*Seems to be restricted to dolomite oreos, could be confused with *A. pachygaster*.****Aloe buettneri* A.Berger****Status: VU D2**

Threats: Collection

Distribution: North-West

*Restricted to one form in Namibia but common elsewhere. Last collected in 1973.****Aloe corallina* I.Verd.****Status: EN D1**

Endemism: Endemic

Threats: Collection

Distribution: North-West

*Lost collected in 1965; grows on inaccessible perpendicular cliffs.****Aloe dewinteri* Giess****Status: VU D1**

Endemism: Endemic

Threats: Collection

Distribution: North-West

*Grows in rock crevices of steep dolomite precipices.****Aloe dinteri* A.Berger****Status: VU D1**

Endemism: Endemic

Threats: Collection

Distribution: North-West, North-West-Central

*Could be confused with *A. sladeniana* and *A. variegata*, grows on plains, in shade and in dolomite crevices.****Aloe erinacea* D.S.Hardy****Status: EN A1adB2cdC1C2a**

Endemism: Endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

*No recruitment from seed in one subpopulation.**Another, recorded in the 1980s, could not be found.****Aloe meyeri* van Jaarsv.****Status: EN B1B2e**

Endemism: Near-endemic

Threats: Mining, collection

Distribution: South-East

*Plants hanging from vertical south-facing cliffs in crevices—probably fairly inaccessible, except for specialist collectors.****Aloe microstigma* Salm-Dyck****Status: VU D1**

Threats: Mining, collection

Distribution: South-Central

*Grows on mountains and plains, distribution is restricted.****Aloe namibensis* Giess****Status: VU D1**

Endemism: Endemic

Threats: Habitat degradation, collection

Distribution: South-West-Central

Aloe pachygaster* Dinter*Status: VU D1**

Endemism: Endemic

Threats: Collection

Distribution: South-West, South-Central

*Could be confused with *A. claviflora* and *A. asperifolia*, closely correlated with dolomite and block limestone.****Aloe pearsonii* Schonland****Status: EN B1B2bce**

Endemism: Near-endemic

Threats: Mining, collection

Distribution: South-West

*Recruitment seems to be very low in subpopulations observed.****Aloe pillansii* L.Guthrie****Status: EN B1B2bceC1**

Endemism: Near-endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

A. pillansii* and *A. dichotoma* cannot be distinguished when young; they do not flower until 2 m tall. No recruitment was seen.**Aloe ramosissima* Pillans****Status: VU A1c2cC2a**

Endemism: Near-endemic

Threats: Habitat degradation, mining, collection, pests/disease

Distribution: South-West

Aloe sladeniana* Pole-Evans*Status: VU C2a**

Endemism: Endemic

Threats: Collection

Distribution: North-West-Central

*Very pretty plant from intensely hot arid oreos on western escarpment, could be confused with *A. variegata* and *A. dinteri*.****Aloe viridiflora* Reynolds****Status: VU B1B2cC2aD1**

Endemism: Endemic

Threats: Collection

Distribution: Central

*Distribution is limited. No evidence of a continuing decline.****Bulbine caput-medusae* G.Will.****Status: EN B1B2ce**

Endemism: Endemic

Threats: Mining, collection

Distribution: South-West

*In very windy area that gets fog, summer and winter rain.****Bulbine francescae* G.Will. & Baijnath****Status: EN B1B2ce**

Endemism: Endemic

Threats: Mining, collection

Distribution: South-West

*Bulb difficult to get out because it grows in rock crevices.****Bulbine namaensis* Schinz****Status: VU D2**

Endemism: Endemic

Threats: Collection

Distribution: South-West-Central, South-West

Trachyandra peculiaris* (Dinter) Oberm.*Status: VU D2**

Endemism: Endemic

Threats: Mining

Distribution: South-West

Known from type specimen only.

ASTERACEAE

Anisopappus pseudopinnatifidus* S.Ortiz & Paiva*Status: VU D2**

Endemism: Endemic

*Known from type specimen only.****Arctotis frutescens* Norl.****Status: VU D2**

Endemism: Endemic

Distribution: South-West

*In rock cracks.****Eremothamnus marlothianus* O.Hoffm.****Status: VU B1B2cC2a**

Endemism: Endemic

Threats: Mining

Distribution: South-West

*Monotypic Namibian endemic genus.****Eriocephalus klughardtensis* M.A.N.Müller****Status: VU D2**

Endemism: Endemic

Threats: Mining
Distribution: South-West
Restricted to one mountain, but is relatively common.

Euryops mucosus B.Nord.
Status: EN B1B2cC2a
Endemism: Endemic
Threats: Mining
Distribution: South-West
Known from two collections only, not collected since 1973.

Euryops walterorum Merxm.
Status: VU D2
Endemism: Endemic
Distribution: Central

Felicia alba Grau
Status: EN B1B2c
Endemism: Endemic
Threats: Urban expansion
Distribution: North-Central
Known from two collections only. Attractive when in flower.

Felicia gunillae B.Nord.
Status: VU D2
Endemism: Endemic
Distribution: North-West-Central
Known from type only collected in good rain year; scorched far, but not found since.

Gazania thermalis Dinter
Status: EN B1B2cdC2aD1
Endemism: Endemic
Threats: Habitat degradation
Distribution: Central to South-Central
Known from only three collections; not collected since 1980.

Lasiopogon ponticus Hilliard
Status: VU D2
Endemism: Endemic
Threats: Mining
Distribution: South-West

Nidorella nordenstamii Wild
Status: VU D2
Endemism: Endemic
Threats: Habitat degradation
Distribution: North-West-Central
Known from type only collected in good rain year, scorched far, but not found since.

Othonna clavifolia Marloth
Status: VU D2
Endemism: Endemic
Threats: Mining, collection
Distribution: South-West
Dwarf pachycaul and very appealing.

Othonna cyclophylla Merxm.
Status: VU D2
Endemism: Near-endemic
Threats: Collection
Distribution: South-East
On quartz ridge or dalerite, not collected since 1970s, known from two localities only.

Pentatrichia avasmontana Merxm.
Status: VU D2
Endemism: Endemic
Distribution: Central
Cushion-shaped shrub, hangs from rocks, vertical mountain wall.

Pentzia tomentosa B.Nord.
Status: VU D2
Endemism: Endemic
Distribution: North-West-Central
Known from type specimen only.

Pteronia spinulosa E.Phillips
Status: EN B1B2cdC2aD1

Endemism: Endemic
Threats: Mining
Distribution: South-West
All specimens collected along the coast, except one that needs verification.

CAMPANULACEAE

Namacodon schinzianum (Markgr.) Thulin
Status: VU D1
Endemism: Endemic
Distribution: Central
Monotypic Namibian endemic genus.

CAPPARACEAE

Cadaba termitaria N.E.Br.
Status: VU D2
Distribution: East
Known from two collections only.

CHENOPODIACEAE

Suaeda salina B.Nord.
Status: VU D2
Endemism: Endemic
Threats: Grazing/browsing
Distribution: North-Central
Known from type specimen only.

CRASSULACEAE

Crassula atropurpurea (Haw.) D.Dietr. var. *cultiformis* (Friedrich) Toelken
Status: VU D2
Endemism: Near-endemic
Threats: Mining

Crassula aurisbergensis G.Will.
Status: EN B1B2e
Endemism: Endemic
Threats: Collection, mining
Distribution: South-West
On summit of mountains, needs fog. Sought after by collectors as it is a miniature.

Crassula ausensis Hutchison subsp. *ausensis*
Status: VU B1B2c
Endemism: Endemic
Threats: Collection, mining
Distribution: South-West
Prefers granite, sandstone or outcrops of quartzite.

Crassula ausensis P.Hutchison subsp. *giessii* (Friedrich) Toelken
Status: VU D2
Endemism: Endemic
Threats: Collection, mining
Distribution: South-West-Central

Crassula campestris (Eckl. & Zeyh.) Endl. ex Walp.
Status: VU D2
Distribution: South-West
Known from one locality only. Plants are very small and may have been overlooked.

Crassula capitella Thunb. subsp. *nodulosa* (Schonland) Toelken
Status: VU D2
Threats: Collection

Crassula corallina Thunb. subsp. *corallina*
Status: VU D2
Distribution: South-West, South-East
Problematic in cultivation. Very limited distribution.

Crassula cotyledonis Thunb.
Status: VU D2
Threats: Collection
Distribution: South-West

Crassula elegans Schonland & Baker f. subsp. *namibensis* (Friedrich) Toelken
Status: EN B1B2bc
Endemism: Endemic
Threats: Urban expansion, collection
Distribution: South-West
On rocky slopes, often in exposed positions near coast.

Crassula expansa Dryand. subsp. *pyrifolia* (Compton) Toelken
Status: VU D2
Endemism: Near-endemic
Threats: Collection
Distribution: South-West
In cultivation.

Crassula garibina Marloth & Schonland subsp. *garibina*
Status: EN B1B2cd
Endemism: Near-endemic
Threats: Habitat degradation, mining, collection
Distribution: South-West
Threatened by increasing human population along the river.

Crassula luederitzii Schonland
Status: VU D2
Endemism: Endemic
Threats: Mining
Distribution: South-West

Crassula namaquensis Schonland & Baker f. subsp. *namaquensis*
Status: VU D2
Endemism: Near-endemic
Distribution: South-West

Crassula nemorosa (Eckl. & Zeyh.) Endl. ex Walp.
Status: VU D2
Threats: Collection
Distribution: South-West
One specimen collected in the 1970s only.

Crassula numaisensis Friedrich
Status: VU B1B2cdD1
Endemism: Endemic
Threats: Mining, collection
Distribution: South-West
Known from type only, but considered to be a distinct taxon.

Crassula oblancoolata Schonland & Baker f.
Status: VU D2
Threats: Collection
Distribution: South-West

Crassula plegmatoides Friedrich
Status: VU D2
Endemism: Near-endemic
Distribution: South-West

Crassula pseudohemisphaerica Friedrich
Status: VU D2
Endemism: Near-endemic
Threats: Mining, collection
Distribution: South-West

Crassula rupestris Thunb. subsp. *commutata* (Friedrich) Toelken
Status: VU D2
Endemism: Near-endemic
Threats: Mining, collection
Distribution: South-West

Crassula thunbergiana Schult. subsp. *minutiflora* (Schonland & Baker f.) Toelken
Status: EN B1B2cC2a
Endemism: Near-endemic
Threats: Collection
Distribution: South-West
Known from one collection in 1959, may be undercollected as it is a small prostrate fleshy herb.

Tylecadan aridimantanus G.Will.

Status: EN B1B2cd

Endemism: Endemic

Threats: Mining, collection

Distribution: South-West

Bottered by sond-blostring winds.

Tylecodon aurusbergensis G.Will. & van Jaarsv.

Status: EN B1B2cd

Endemism: Endemic

Threats: Mining, collection

Distribution: South-West

Grows in rock cracks just below the south face of summit of inselberg.

Tylecodon buchholzianus (Schuldt & Stephens) Taelken

Status: VU D2

Endemism: Near-endemic

Threats: Mining, collection

Distribution: South-West

Tylecadan hallii (Taelken) Taelken

Status: VU D2

Endemism: Near-endemic

Threats: Mining, collection

Distribution: South-West

Uncommon in collections. Plants are winter growing and therefore provide odded interest during a time that most collections are dormant.

Tylecodon racemosus (Harv.) Toelken

Status: EN B1B2cd

Endemism: Near-endemic

Threats: Mining, collection

Distribution: South-West

Lower grovelly slopes or vertical cliff in rovine.

Tylecodon singularis (R.A.Dyer) Taelken

Status: EN B1B2cd

Endemism: Near-endemic

Threats: Mining, urban expansion,

Distribution: South-West

Tylecadan walichii (Harv.) Toelken subsp.

ecklonianus (Harv.) Toelken

Status: VU D2

Endemism: Near-endemic

Distribution: South-West

Could be poisonous.

Known from one location only on upper slopes.

Eriospermum flexum P.L.Perry

Status: VU D2

Endemism: Endemic

Distribution: Central

Known from one collection only.

Eriospermum halenbergense Dinter

Status: VU D2

Endemism: Endemic

Threats: Mining

Distribution: South-West

Coostol desert on sondy plain.

Eriaspermum lavranosii P.L.Perry

Status: VU D2

Endemism: Endemic

Distribution: Central

EUPHORBACEAE

Euphorbia angrae N.E.Br.

Status: VU B1B2cd

Endemism: Endemic

Threats: Mining, collection

Distribution: South-West

Euphorbia beratica N.E.Br.

Status: VU D2

Endemism: Near-endemic

Threats: Collection

Known from one specimen only.

Euphorbia cibdela N.E.Br.

Status: VU D2

Endemism: Near-endemic

Threats: Mining, collection

Distribution: South-West

Euphorbia eduardai L.C.Leach

Status: VU D2

Endemism: Near-endemic

Threats: Collection

Distribution: North-West

No young individuals have been seen.

Euphorbia friedrichiae Dinter

Status: VU D2

Endemism: Endemic

Threats: Grazing/browsing, collection

Distribution: South-East

Not collected for 60 years.

Euphorbia herrei A.C.White, R.A.Dyer & B.Sloane

Status: EN A1cB2c

Endemism: Near-endemic

Threats: Mining, collection

Distribution: South-West

Euphorbia kaokoensis (A.C.White, R.A.Dyer &

B.Slaane) L.C.Leach

Status: VU D2

Endemism: Endemic

Threats: Collection

Distribution: North-West

Euphorbia lavrani L.C.Leach

Status: CR B1B2cC2bd1

Endemism: Endemic

Threats: Collection

Distribution: South-West

Known from type and one other specimen. Restricted to limestone and distribution may therefore be frogmented.

Euphorbia leisteri R.H.Archer

Status: EN B1B2cC2bd1

Endemism: Endemic

Threats: Urban expansion, collection

Distribution: North-West

Known from type only, but is in cultivation.

Eupharbia melanahydrata Nel

Status: VU A1c2cB1B2c

Endemism: Near-endemic

Threats: Mining, collection

Distribution: South-West

On sondy plains.

Eupharbia manteirai Haak.f. subsp.

brandbergensis B.Nard.

Status: VU D1D2

Endemism: Endemic

Threats: Collection

Distribution: North-West-Central

Eupharbia namibensis Marlath

Status: VU B1B2ce

Endemism: Endemic

Threats: Mining, collection

Distribution: South-East

Euphorbia namuskluftensis L.C.Leach

Status: CR D1

Endemism: Endemic

Threats: Collection

Distribution: South-West

Limestone outcrop only, not found during field work.

Eupharbia otjipembana L.C.Leach

Status: EN D1

Endemism: Endemic

Threats: Habitat degradation

Distribution: North-West

Not collected for 27 years, stony slopes; distribution may therefore be frogmented.

Eupharbia subsalsa Hiern subsp. *fluvialis*

L.C.Leach

Status: VU D2

Endemism: Near-endemic

Threats: Urban expansion, collection

Restricted to rocky sites on both banks of the Kunene River.

Euphorbia verruculosa N.E.Br.

Status: VU A1c2cB1B2c

Endemism: Endemic

Threats: Mining, collection

Distribution: South-West

FABACEAE

Baikiaea plurijuga Harms

Status: VU A1bcd2bcd

Threats: Urban expansion, grazing/browsing, fire, agriculture

Distribution: North-Central, East

Commercially logged for over 50 years. Young trees destroyed by fire. Voluable timber.

Caesalpinia merxmeullerana A.Schreib.

Status: VU D1

Endemism: Endemic

Distribution: South-Central

Probably undercollected; in very inaccessible areos.

Decorsea dinteri (Harms) Verdc.

Status: VU D2

Endemism: Endemic

Threats: Harvesting

Distribution: Central

Known from type specimen only.

Elephantorrhiza rangei Harms

Status: EN B1B2cdD1

Endemism: Endemic

Threats: Habitat degradation, road network

Distribution: South-West-Central

Very limited distribution.

Eriasema harmsiana Dinter

Status: VU D2

Endemism: Endemic

Threats: Harvesting

CUCURBITACEAE

Cucumella clavipetalata J.H.Kirkbr.

Status: EN C2a

Endemism: Endemic

Distribution: West-Central

CYPERACEAE

Valkiella disticha Merxm. & Czech

Status: VU D2

Endemism: Near-endemic (D)

Threats: Urban expansion

Distribution: North-East

Annual sedge/herb, on river terrace.

ERIOSPERMACEAE

Eriospermum buchubergense Dinter

Status: VU D2

Endemism: Endemic

Threats: Mining

Distribution: South-West

Known from type specimen only, o distinctive species, but locks flowers and bulb.

Eriospermum citrinum P.L.Perry

Status: VU D2

Endemism: Endemic

Distribution: Central

Distribution: Central
Known from type only, collected in 1930s.

***Lebeckia dinteri* Harms**
Status: VU D2
Endemism: Endemic
Distribution: South-West

***Lotononis mirabilis* Dinter**
Status: VU D2
Endemism: Endemic
Distribution: South-West
Known from type and two specimens only, not collected since 1920s.

***Lotononis pachycarpa* Dinter ex B.-E.van Wyk**
Status: VU D2
Endemism: Endemic
Threats: Mining
Distribution: South-West

***Pterocarpus angolensis* DC.**
Status: VU A1bcd2bcd
Threats: Urban expansion, fire, agriculture
Distribution: North-Central
One of the most valuable woods.

HYACINTHACEAE

***Bowiea gariensis* van Jaarsv.**
Status: VU D2
Endemism: Near-endemic
Distribution: South-West
Limited distribution.

***Lachenalia buchbergensis* Dinter**
Status: VU D2
Endemism: Near-endemic
Threats: Mining, collection
Distribution: South-West
May be undercollected because it is small and timing for collecting must be right.

***Lachenalia klinghardtiana* Dinter**
Status: VU D2
Endemism: Endemic
Threats: Mining, collection
Distribution: South-West

***Lachenalia namibiensis* W.F.Barker**
Status: VU D2
Endemism: Endemic
Threats: Mining, collection
Distribution: South-West
Plants in cultivation are twice the size of the wild ones.

***Lachenalia nordenstamii* W.F.Barker**
Status: VU D2
Endemism: Near-endemic
Threats: Mining, collection
In sheltered rock cracks.

***Lachenalia nutans* G.D.Duncan**
Status: VU D2
Endemism: Endemic
Threats: Mining, collection
Distribution: South-West
Known from two collections only.

***Ornithogalum deltoideum* Baker**
Status: VU D2
Endemism: Near-endemic
Distribution: South-East
Collected in 1923 only.

***Ornithogalum geniculatum* Oberm.**
Status: VU D2
Endemism: Near-endemic
Distribution: South-West

***Ornithogalum merxmülleri* Roesler**
Status: VU D2
Endemism: Endemic

Distribution: South-West
Known from type only.

***Ornithogalum puberulum* Oberm.**
Status: VU D2
Endemism: Near-endemic
Distribution: South-West
In crevices of overhanging reefs, near summit.

***Rhadamanthus fasciatus* B.Nord.**
Status: VU D2
Threats: Mining
Distribution: North-East
Only collected in 1965, in white quartz stone near o mine.

***Rhadamanthus namibensis* Oberm.**
Status: VU D1D2
Endemism: Endemic
Threats: Habitat degradation
Distribution: South-West

***Rhadamanthus secundus* B.Nord.**
Status: VU D2
Endemism: Endemic
Threats: Mining
Distribution: South-West

IRIDACEAE

***Babiana longicollis* Dinter**
Status: VU D2
Endemism: Endemic
Threats: Mining, collection
Distribution: South-West
Known from type only.

***Ferraria schaeferi* Dinter**
Status: VU B1B2cd
Endemism: Near-endemic
Threats: Mining, collection
Distribution: South-West
Fewer than ten locations, sparsely distributed.

***Moraea garipensis* Goldblatt**
Status: EN B1B2cd1
Endemism: Endemic
Threats: Urban expansion, collection
Distribution: South-West
Grows in cracks in granitoid rocky outcrops above river—a most unexpected locality for o *Moraea*, let alone on unspecialised one. Least specialised species in the genus. It has no obvious adaptations for drought resistance. Large yellow flowers.

***Moraea graniticola* Goldblatt**
Status: EN B1B2cd1
Endemism: Endemic
Threats: Collection
Distribution: South-West
Known from o single collection, probably occurs elsewhere. Of collector's interest. As it occurs in townlands which could be over-used, e.g. wood collecting, grazing, it is probably threatened.

***Moraea hexaglottis* Goldblatt**
Status: VU D2
Endemism: Endemic
Threats: Collection
Distribution: South-West
Known from several sites on o single form, but may be more widespread on the Huib Plateau.

***Moraea namibensis* Goldblatt**
Status: VU D2
Endemism: Endemic
Threats: Collection
Distribution: South-West
Winter rainfall, sandy flats amongst low scattered bushes and small annuals; previously misidentified, so may be found to be more widespread when area is more botanically explored.

KIRKIACEAE

***Kirkia dewinteri* Merxm. & Heine**
Status: VU D2
Endemism: Endemic
Threats: Habitat destruction
Distribution: North-West to South-West-Central

LAMIACEAE

***Plectranthus unguentarius* Codd**
Status: EN B1B2e
Endemism: Endemic
Distribution: North-West
Used traditionally. Not collected since 1960, although it is an erect, robust semi-succulent suffrutescent.

LOBELIACEAE

***Lobelia hereroensis* Schinz**
Status: VU D2
Endemism: Endemic
Threats: Habitat degradation
Distribution: Central, North-West-Central
Could be so small and hidden in moss that it is overlooked. Distribution of similar habitats is limited and subject to drying out or over-use when water is scarce.

MESEMBRYANTHEACEAE

***Amphibolia obscura* H.E.K.Hartmann**
Status: VU B1B2c
Threats: Mining, collection
Distribution: South-West
Seems to be restricted to hills in small area.

***Antimima argentea* (L.Bolus) H.E.K.Hartmann**
Status: VU D2
Endemism: Endemic
Threats: Collection
Distribution: South-West
Known from one population only. Very attractive flowers.

***Antimima aurasensis* H.E.K.Hartmann**
Status: VU D2
Endemism: Endemic
Threats: Mining, collection
Distribution: South-West
Known from limited area only.

***Antimima buchbergensis* (Dinter) H.E.K.Hartmann**
Status: VU D2
Endemism: Endemic
Threats: Collection
Distribution: South-West
Known from one locality only.

***Antimima eendornensis* (Dinter) H.E.K.Hartmann**
Status: VU D2
Endemism: Endemic
Threats: Collection
Distribution: South-East

***Antimima modesta* (L.Bolus) H.E.K.Hartmann**
Status: VU B1B2c
Endemism: Endemic
Threats: Mining, grazing/browsing, collection
Distribution: South-East
Restricted distribution.

***Antimima quartzitica* (Dinter) H.E.K.Hartmann**
Status: VU B1B2c
Endemism: Endemic
Threats: Mining, collection
Distribution: South-West
Restricted distribution.

Astridia citrina* (L.Bolus) L.Bolus*Status:** VU B1B2c

Endemism: Near-endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

*Restricted to rocky places only (koppies and inselbergs).****Astridia hallii* L.Bolus****Status:** VU B1B2c

Endemism: Endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

*Grows on rocky inselbergs and koppies.****Astridia langifolia* (L.Bolus) L.Bolus****Status:** VU B1B2c

Endemism: Near-endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

*Very pretty red flower. The most common species in the genus.****Astridia speciosa* L.Bolus****Status:** EN B1B2c

Endemism: Near-endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

*Exceptionally pretty red flower. Restricted distribution.****Astridia velutina* Dinter & Schwantes****Status:** VU B1B2abcdeC1C2a

Threats: Habitat degradation, mining, collection

Distribution: South-West

*One population at a mine is probably destroyed by nav.****Brownanthus namibensis* (Marloth) Bullock****Status:** VU D2

Endemism: Endemic

Threats: Mining

Distribution: South-West

*Habitat limited (along coast).****Brownanthus pubescens* (N.E.Br. ex C.A.Maas) Bullock****Status:** VU D2

Endemism: Endemic

Threats: Mining

Distribution: South-West

*Dwarf shrub with very striking appearance.****Cephalophyllum compressum* L.Bolus****Status:** VU B1B2ce

Endemism: Endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

*Restricted distribution.****Cephalophyllum confusum* (Dinter) Dinter & Schwantes****Status:** VU B1B2bcdeC2a

Endemism: Endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

*Mountains and inselbergs. One subpopulation at a mine is probably destroyed by now.****Cephalophyllum herrei* L.Balus****Status:** VU C2a

Endemism: Near-endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

Chasmatophyllum musculinum* (Haw.) Dinter & Schwantes*Status:** VU C2a

Threats: Collection

Distribution: South-East

*Very attractive plant with pretty flower, easy to propagate.****Conophytum angelicae* (Dinter & Schwantes) N.E.Br. subsp. *angelicae*****Status:** CR C2a

Threats: Mining, agriculture, collection

Distribution: South-East

*In the past 30 years only five plants have been recorded.****Conophytum friedrichae* (Dinter) Schwantes****Status:** EN B1B2ceC2a

Endemism: Near-endemic

Threats: Collection

Distribution: South-East

*Limited distribution.****Conophytum gratum* (N.E.Br.) N.E.Br. subsp. *gratum*****Status:** EN B1B2ceC2a

Endemism: Near-endemic

Threats: Collection

Distribution: South-West

*Hos o wide range.****Conophytum halenbergense* (Dinter & Schwantes) N.E.Br.****Status:** EN C2a

Endemism: Endemic

Threats: Collection

Distribution: South-West

*Shows amazing resemblance to the Schloffkuppe form of C. taylorianum subsp. ernianum.****Conophytum klinghardtense* Rawe subsp. *baradii* (Rawe) S.A.Hammer****Status:** EN B1B2ceC2a

Endemism: Endemic

Threats: Collection

Distribution: South-West

Conophytum klinghardtense* Rawe subsp. *klinghardtense**Status:** EN B1B2ceC2a

Endemism: Endemic

Threats: Collection

Distribution: South-West

*Known from only one location.****Conophytum laeschianum* Tischer****Status:** EN B1B2ceC2a

Endemism: Near-endemic

Threats: Collection

Distribution: South-West

Conophytum maughanii* N.E.Br. subsp. *maughanii**Status:** VU D2

Threats: Collection

Distribution: South-East

*Plants are cryptic most of the year, therefore it could be more widespread.****Conophytum pageae* (N.E.Br.) N.E.Br.****Status:** VU C2a

Threats: Habitat degradation, mining, collection

Distribution: South-West

*Pretty flower, common in cultivation.****Conophytum quaesitum* (N.E.Br.) N.E.Br. subsp. *densipunctum* (L.Bolus) S.A.Hammer****Status:** EN B1B2e

Endemism: Endemic

Threats: Collection

Distribution: South-East

*Common in cultivation.****Conophytum quaesitum* (N.E.Br.) N.E.Br. subsp. *quaesitum* var. *rostratum* (Tischer) S.A.Hammer****Status:** EN B1B2ceC2a

Endemism: Near-endemic

Threats: Collection

Distribution: South-West

*Often grows on steep faces and in deep narrow crevices.****Conophytum quaesitum* (N.E.Br.) N.E.Br. subsp. *quaesitum* var. *quaesitum*****Status:** EN B1B2e

Threats: Habitat degradation, mining, collection

Distribution: South-West

Canaphytum ricardianum* Loesch & Tischer subsp. *ricardianum**Status:** EN B1B2ceC2a

Endemism: Endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West, South-Central

*Known with certainty from only one location. Not easily cultivated.****Canaphytum saxetanum* (N.E.Br.) N.E.Br.****Status:** VU B1B2ceC2a

Endemism: Near-endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

Conophytum taylorianum* (Dinter & Schwantes) N.E.Br. subsp. *ernianum* (Loesch & Tischer) de Boer ex S.A.Hammer*Status:** VU B1B2ceC2a

Endemism: Endemic

Threats: Collection

Distribution: South-West

Conaphytum taylorianum* (Dinter & Schwantes) N.E.Br. subsp. *taylorianum**Status:** EN B1B2ceC2a

Endemism: Endemic

Threats: Collection

Distribution: South-West

*Known from one locality only.****Dracophilus montis-draconis* (Dinter) Dinter & Schwantes****Status:** VU C2a

Endemism: Endemic

Threats: Habitat degradation, mining, collection

Distribution: Karas

*In many localities, but limited area.****Eberlanzia schneideriana* (A.Berger) H.E.K.Hartmann****Status:** VU B1B2ce

Endemism: Endemic?

Threats: Habitat degradation, mining, collection

Distribution: South-West

Fenestraria rhapalophylla* (Schltr. & Diels) N.E.Br. subsp. *aurantiaca* (N.E.Br.) H.E.K.Hartmann*Status:** EN C1C2a

Endemism: Near-endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

*Severely threatened by mining, one population already damaged by road building.****Fenestraria rhopalophylla* (Schltr. & Diels) N.E.Br. subsp. *rhopalophylla*****Status:** VU A1acC1C2a

Endemism: Endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

*Road building and prospecting have already damaged same populations.****Hartmanthus hallii* (L.Balus) S.A.Hammer****Status:** EN B1B2e

Endemism: Near-endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

*Desirable horticultural subject.****Hartmanthus pergamentaceus* (L.Balus) S.A.Hammer****Status:** VU B1B2eC2a

Threats: Habitat degradation, mining, collection

Distribution: South-West

*Vast colonies occur in one area.****Jensenabatrya lassawiana* A.G.J.Herre****Status:** EN B1B2ce

Endemism: Endemic

Threats: Collection

Distribution: South-West-Central

Very pretty flower, unusual plant.

Juttadinteria deserticola (Marloth) Schwantes
Status: VU B1B2ce
 Endemism: Endemic
 Threats: Habitat degradation, mining, collection
 Distribution: South-West

Juttadinteria kovismontana (Dinter) Schwantes
Status: EN B1B2ce
 Endemism: Endemic
 Threats: Habitat degradation, mining, collection
 Distribution: South-West

Juttadinteria simpsonii (Dinter) Schwantes
Status: EN B1B2ce
 Endemism: Endemic
 Threats: Habitat degradation, mining, collection
 Distribution: South-West

Juttadinteria suavissima (Dinter) Schwantes
Status: VU B1B2ceC2a
 Endemism: Endemic
 Threats: Habitat degradation, mining, collection
 Distribution: South-West

Lithops dinteri Schwantes subsp. *dinteri* var. *dinteri*
Status: VU B1B2ce
 Endemism: Endemic
 Threats: Collection
 Distribution: South-East
Probably in cultivation.

Lithops dinteri Schwantes subsp. *multipunctata* (de Boer) D.T.Cole
Status: EN B1B2ce
 Endemism: Endemic
 Threats: Collection
 Distribution: South-East
Probably in cultivation.

Lithops francisci (Dinter & Schwantes) N.E.Br.
Status: EN B1B2c
 Endemism: Endemic
 Threats: Collection
 Distribution: South-West
Known from limited areo only, probably in cultivation.

Lithops fulviceps (N.E.Br.) N.E.Br. var. *lactinea* D.T.Cole
Status: EN C2b
 Endemism: Endemic
 Threats: Collection
 Distribution: South-Central
Probably in cultivation.

Lithops fulviceps (N.E.Br.) N.E.Br. var. *fulviceps*
Status: VU C2a
 Threats: Collection
 Distribution: South-East
Known from restricted distribution only.

Lithops gesineae de Boer var. *gesinae*
Status: EN B1B2e
 Endemism: Endemic
 Threats: Collection
 Distribution: South-West
Only known from two localities, probably in cultivation.

Lithops gesineae de Boer var. *annae* (de Boer) D.T.Cole
Status: EN B1B2e
 Endemism: Endemic
 Threats: Collection
 Distribution: South-Central
Only known from two localities, probably in cultivation.

Lithops gracilidelineata Dinter subsp. *brandbergensis* (de Boer) D.T.Cole
Status: EN B1B2e
 Endemism: Endemic
 Threats: Collection
 Distribution: North-West-Central
*Occurs on the top of the mountain, the greatest altitude yet recorded for a *Lithops* habitat.*

Lithops gracilidelineata Dinter subsp. *gracilidelineata* var. *gracilidelineata*
Status: VU C2a
 Threats: Collection
 Distribution: North-West-Central
Probably in cultivation.

Lithops gracilidelineata Dinter subsp. *waldroniae* de Boer
Status: EN B1B2ceC2a
 Endemism: Endemic
 Threats: Collection
 Distribution: South-West-Central

Lithops hermetica D.T.Cole
Status: CR A1dB1B2e
 Endemism: Endemic
 Threats: Collection, mining
 Distribution: South-West
The species name, meaning 'hermetically sealed', refers to the diamond areo where plants are considered reasonably safe. It was no doubt applied in irony as the toxin's author is very concerned about ongoing illegal collecting in the areo.

Lithops herrei L.Bolus
Status: EN B1B2ceC2a
 Endemism: Near-endemic
 Threats: Collection
 Distribution: South-West

Lithops julii (Dinter & Schwantes) N.E.Br. subsp. *fulleri* (N.E.Br.) Fearn var. *rauxii* (de Boer) D.T.Cole
Status: EN C2a
 Endemism: Endemic
 Threats: Collection
 Distribution: South-East
Probably in cultivation.

Lithops julii (Dinter & Schwantes) N.E.Br. subsp. *julii*
Status: VU C2a
 Endemism: Endemic
 Threats: Collection
 Distribution: South-East
Probably in cultivation.

Lithops karasantana (Dinter & Schwantes) N.E.Br. subsp. *bella* (N.E.Br.) D.T.Cole
Status: EN C2a
 Endemism: Endemic
 Threats: Collection

Lithops karasantana (Dinter & Schwantes) N.E.Br. subsp. *eberlanzii* (Dinter & Schwantes) D.T.Cole
Status: VU C2a
 Endemism: Endemic
 Threats: Collection
 Distribution: South-West

Lithops karasmontana (Dinter & Schwantes) N.E.Br. subsp. *karasmontana* var. *aiaisensis* (de Boer) D.T.Cole
Status: EN B1B2e
 Endemism: Endemic
 Threats: Collection
 Distribution: South-West
Known from restricted distribution only.

Lithops karasantana (Dinter & Schwantes) N.E.Br. subsp. *karasantana* var. *karasmontana*
Status: VU C2a
 Endemism: Endemic
 Threats: Collection
 Distribution: South-East

Lithops karasantana (Dinter & Schwantes) N.E.Br. subsp. *karasantana* var. *lericheana* (Dinter & Schwantes) D.T.Cole
Status: EN B1B2e
 Endemism: Endemic

Threats: Collection
 Distribution: South-East

Lithops karasmontana (Dinter & Schwantes) N.E.Br. subsp. *karasmontana* var. *tischeri* D.T.Cole
Status: EN B1B2ceC2ab
 Endemism: Endemic
 Threats: Collection
 Distribution: South-East
Known from one locality only.

Lithops pseudotruncatella (A.Berger) N.E.Br. subsp. *archaeae* (de Boer) D.T.Cole
Status: VU D1D2
 Endemism: Endemic
 Threats: Collection
 Distribution: South-West-Central
Known from restricted distribution only.

Lithops pseudotruncatella (A.Berger) N.E.Br. subsp. *dentritica* (Nel) D.T.Cole
Status: VU C2a
 Endemism: Endemic
 Threats: Collection
 Distribution: Central
Known from restricted distribution only.

Lithops pseudotruncatella (A.Berger) N.E.Br. subsp. *graendrayensis* (H.Jacobsen) D.T.Cole
Status: EN B1B2ceC2a
 Endemism: Endemic
 Threats: Collection
 Distribution: Central
Known from restricted distribution only.

Lithops pseudotruncatella (A.Berger) N.E.Br. subsp. *pseudotruncatella* (A.Berger) N.E.Br. var. *elisabethiae* (Dinter) de Boer & Boom
Status: EN B1B2ceC2ab
 Endemism: Endemic
 Threats: Collection
 Distribution: Central
Known from one locality only.

Lithops pseudotruncatella (A.Berger) N.E.Br. subsp. *pseudotruncatella* (A.Berger) N.E.Br. var. *riehmerae* D.T.Cole
Status: EN B1B2ceC2a
 Endemism: Endemic
 Threats: Collection
 Distribution: Central
Known from restricted distribution only.

Lithops pseudotruncatella (A.Berger) N.E.Br. subsp. *volkii* (Schwantes ex de Boer & Boom) D.T.Cole
Status: EN B1B2ceC2abD1
 Endemism: Endemic
 Threats: Collection
 Distribution: Central

Lithops ruschiorum (Dinter & Schwantes) N.E.Br. var. *ruschiarum*
Status: VU C2a
 Endemism: Endemic
 Threats: Collection
 Distribution: North-West-Central

Lithops ruschiorum (Dinter & Schwantes) N.E.Br. var. *lineata* (Nel) D.T.Cole
Status: VU B1B2ceC2a
 Endemism: Endemic
 Threats: Collection
 Distribution: North-West-Central

Lithops schwantesii Dinter subsp. *gebseri* (de Boer) D.T.Cole
Status: EN B1B2ceC2a
 Endemism: Endemic
 Threats: Collection
 Distribution: South-Central
Known from restricted distribution only.

Lithops schwantesii Dinter subsp. *schwantesii* var. *urikosensis* (Dinter) de Boer & Boom
Status: VU C2a
Endemism: Endemic
Threats: Collection
Distribution: South-Central

Lithops schwantesii Dinter subsp. *schwantesii* var. *marthae* (Loesch & Tischer) D.T.Cole
Status: EN C2a
Endemism: Endemic
Threats: Collection
Distribution: South-West

Lithops schwantesii Dinter subsp. *schwantesii* var. *schwantesii*
Status: VU C2a
Endemism: Endemic
Threats: Collection
Distribution: South-Central

Lithops schwantesii Dinter subsp. *schwantesii* var. *rugosa* (Dinter) de Boer & Boom
Status: CR C2a
Endemism: Endemic
Threats: Collection
Distribution: South-Central

Lithops vallis-mariae (Dinter & Schwantes) N.E.Br.
Status: VU C2a
Endemism: Endemic
Threats: Collection
Distribution: South-Central, East-Central

Lithops wernerii Schwantes ex H.Jacobsen
Status: CR B1B2eC2b
Endemism: Endemic
Threats: Collection
Distribution: North-West-Central
Known from one locality only.

Namibia cinerea (Marloth) Schwantes
Status: EN B1B2e
Endemism: Endemic
Threats: Habitat degradation, mining, collection
Distribution: South-West
Common in extremely restricted areas.

Nananthus aloides (Haw.) Schwantes
Status: EN B1B2ce
Threats: agriculture, collection
Distribution: East-Central
From limestone/calcrete pan areas. Very attractive plant and flower. Undercollected.

Nananthus margaritifera L.Bolus
Status: EN B1B2ce
Threats: agriculture, collection
Distribution: East-Central
Limestone/calcrete pan areas, probably only a few subpopulations.

Psammophora nissenii (Dinter) Dinter & Schwantes
Status: VU B1B2ce
Endemism: Near-endemic
Threats: Habitat degradation, mining, collection
Distribution: South
Very attractive plant.

Psammophora saxicola H.E.K.Hartmann
Status: EN B1B2ce
Endemism: Near-endemic
Threats: Habitat degradation, mining, collection
Distribution: South-West
There are apparently several large well-established subpopulations.

Ruschianthemum gigas (Dinter) Friedrich
Status: VU C2a
Endemism: Endemic?
Threats: Habitat degradation, mining, collection

Distribution: South-West
Occurs in mountain areas, not sandy plains.

Schwantesia constanceae N.Zimm.
Status: VU D2
Endemism: Endemic
Threats: Collection

MOLLUGINACEAE

Suessenguthiella caespitosa Friedrich
Status: VU D2
Endemism: Endemic
Distribution: South-West
Known from type and one specimen only; not collected since 1929. Probably overlooked as it is very small.

ORCHIDACEAE

Ansellia africana Lindl.
Status: VU B1B2e
Threats: Collection
Distribution: North-West, North-East
Medicinal properties. Pretty flowers. Not collected since 1976.

Bartholina ethelae Bolus
Status: VU D2
Threats: Collection
Distribution: South-West
Rare or localised.

Bonatea steudneri (Rchb. f.) T.Durand & Schinz
Status: CR B1B2ce
Threats: Urban expansion, collection
Distribution: Caprivi
Pretty flowers. Not collected since 1979. Pesticides may be causing loss of pollinators.

Eulophia hereroensis Schltr.
Status: EN D1
Threats: Collection
Distribution: North-Central
Lost collected in 1984, appears to be restricted to a few small colonies of up to 20 plants. Has ethnobotanical use.

Eulophia leachii Greatrex ex A.V.Hall
Status: VU B1B2ceD1D2
Threats: Urban expansion, collection
Distribution: North-Central, East
Attractive flowers. May form large colonies. Lost collected in 1976.

Eulophia livingstoniana (Rchb.f.) Summerh.
Status: EN B1B2ce
Threats: Urban expansion, collection
Distribution: North-East
Very pretty flowers. Lost collected in 1963. Occurs in forests and along river.

Eulophia walleri Kraenzl.
Status: VU B1B2ce
Threats: Fire, collection
Distribution: Caprivi
Attractive flower. Occasionally in tall grassland.

Habenaria epipactidea Rchb.f.
Status: VU C2a
Threats: Collection
Distribution: North-Central, North-East

Holothrix filicornis Immelman & Schelpe
Status: EN B1B2ceD1
Endemism: Near-endemic
Threats: Mining, urban expansion, collection
Distribution: South-West

OXALIDACEAE

Oxalis ausensis R.Knuth
Status: VU D2
Endemism: Endemic
Threats: Mining
Distribution: South-West
Known from type (1922) and one specimen (1976). Probably undercollected, as it favours good years.

Oxalis luederitzii Schinz
Status: VU D2
Endemism: Endemic
Distribution: South-West

Oxalis schaeferi R.Knuth
Status: VU D2
Endemism: Endemic
Distribution: South-West
Not collected since the 1920s.

PASSIFLORACEAE

Adenia pechuelii (Engl.) Harms
Status: EN C1C2a
Endemism: Endemic
Threats: Collection
Distribution: North-West, Caprivi
Seeds well in captivity.

PEDALIACEAE

Sesamothamnus leistneri ined. De Winter & Leistner 5504
Status: EN D1
Endemism: Endemic
Distribution: North-West

PLUMBAGINACEAE

Plumbago wissii Friedrich
Status: VU D2
Endemism: Endemic
Distribution: North-West-Central

RUTACEAE

Anginon streyi (Merxm.) Allison & B.-E.van Wyk
Status: VU D2
Endemism: Endemic

SCROPHULARIACEAE

Chamaegigas intrepidus Dinter
Status: EN C2a
Endemism: Endemic
Threats: Collection
Distribution: South-West-Central
Seasonal, submerged plant in granite outcrops. Collected because is considered a "resurrection" plant.

Diclis tenuissima Pilg.
Status: VU D2
Endemism: Endemic
Distribution: South-West-Central
Very small, delicate plants; occur in moss in damp areas. May be undercollected because misidentified. Not collected since 1978.

Dintera pterocaulis Stapf
Status: VU D2
Endemism: Endemic
Distribution: Central
Known from type only, not collected since 1920s. Monospecific Namibian endemic genus.

Nemesia karasbergensis L.Bolus
Status: VU D2
Endemism: Endemic
Distribution: South-East
Known from type only, collected in 1913.

Nemesia violiflora Roessler
Status: VU D2
Endemism: Endemic
Threats: Mining
Distribution: South-West

SELAGINACEAE

Cromidon pusillum (Roessler) Hilliard
Status: VU D2
Endemism: Endemic
Distribution: North-East
Known from one collection in 1939 only.

Selago lepida Hilliard
Status: VU D2
Endemism: Endemic
Threats: Grazing/browsing
Distribution: North-West-Central, South-East
Previously confused with *S. albida*. Pretty and not common.

Selago nactigalii Rolfe
Status: VU D2
Endemism: Endemic
Threats: Grazing/browsing
Distribution: South-West, South-Central

SOLANACEAE

Nicotiana africana Merxm.
Status: VU D1D2
Endemism: Endemic
Threats: Pests/diseases
Distribution: North-West-Central
Occurs on granite outcrops or inselbergs. No juveniles seen, seeds have been used in the USA and South Africa for possible improvement of tobacco. Plants have been grown from seed.

STERCULIACEAE

Dombeya rotundifolia (Hochst.) Planch. var. *velutina* I.Verd.
Status: VU D2
Endemism: Endemic

ULMACEAE

Trema orientalis (L.) Blume
Status: VU D2
Distribution: North-West-Central
Very limited distribution.

VERBENACEAE

Priva auricoccea A.Meeuse
Status: VU D2
Endemism: Endemic
Distribution: North-West
Known from type only.

VITACEAE

Cyphostemma bainesii (Hook.f.) Desc.
Status: VU C2a
Endemism: Endemic
Threats: Collection, harvested
Distribution: North
Fruits eaten.

Cyphostemma juttae (Dinter & Gilg) Desc.
Status: VU B1B2ceC2a
Endemism: Endemic
Threats: Collection, habitat degradation
Distribution: North-Central
Live plants or seed exchanged. Stem sap poisonous. Has ethnobotanical use.

ZYGOPHYLLACEAE

Neoluederitzia sericeocarpa Schinz
Status: VU D2
Endemism: Endemic
Distribution: South-Central

Zygophyllum giessii Merxm. A.Schreib.
Status: VU D2
Endemism: Endemic
Threats: Grazing/browsing
Distribution: South-West
Juveniles and seedlings occur. Grazing damage occurs.

Zygophyllum inflatum Van Zyl
Status: VU D2
Endemism: Near-endemic
Distribution: North-West
Only three specimens seen with abundant seeds.

Zygophyllum macrocarpon Retief
Status: VU D2
Endemism: Near-endemic
Distribution: South-West
Subpopulations are few and small, but seeds are numerous. Weekly grazed.

Zygophyllum pterocaula Van Zyl
Status: VU D2
Endemism: Near-endemic
Threats: Urban expansion
Distribution: South-Central
Not grazed.

Zygophyllum schreiberianum Merxm. & Giess
Status: VU D2
Endemism: Near-endemic
Distribution: South-West
One large subpopulation. Usually occasional. Scattered individuals, juveniles and seedlings seen.

Zygophyllum segmentatum Van Zyl ined.
Status: VU D2
Endemism: Near-endemic
Threats: Mining, urban expansion
Distribution: South-West
Young plants seen.



The erect form of *Juttadinteria deserticola*. (Photo: G. Williamson)



One of the few Namibian orchids, *Eulophia leachii*. (Photo: C. Hines)

LOWER RISK

ACANTHACEAE

Barleria lanceolata (Schinz) Oberm.
Status: LR-lc
Endemism: Endemic
Distribution: wide

Barleria mackenii Hook.f.
Status: LR-lc

Barleria macrostegia Nees
Status: LR-lc

Barleria rigida Willd. ex Nees
Status: LR-lc

Barleria senensis Klotzsch
Status: LR-lc

Barleria solitaria P.G.Mey.
Status: LR-lc
Endemism: Endemic
Distribution: North-West-Central

Blepharis diversispina (Nees) C.B.Clarke
Status: LR-lc

Blepharis furcata (L.f.) Pers.
Status: LR-lc
Endemism: Near-endemic
Distribution: South-West

Blepharis gigantea Oberm.
Status: LR-lc
Endemism: Endemic
Distribution: South-West-Central

Blepharis grossa (Nees) T.Anderson
Status: LR-lc
Endemism: Near-endemic
Distribution: wide

Blepharis integrifolia (L.f.) E.Mey. ex Schinz var.
integrifolia
Status: LR-lc

Blepharis leendertziae Oberm.
Status: LR-lc

Blepharis maderaspatensis (L.) Heyne ex Roth
Status: LR-lc

Blepharis mitrata C.B.Clarke
Status: LR-lc

Blepharis obmitrata C.B.Clarke
Status: LR-lc
Distribution: wide

Blepharis pruinosa Engl.
Status: LR-lc
Endemism: Endemic
Distribution: South-West-Central, Central
Fairly widespread.

Blepharis tenuiramea S.Moore
Status: LR-lc
Distribution: North-East

Justicia guerkeana Schinz
Status: LR-lc
Endemism: Endemic
Distribution: South

Justicia platysepala (S.Moore) P.G.Mey.
Status: LR-lc
Endemism: Endemic
Distribution: wide

Megalochlamys marlothii (Engl.) Lindau
Status: LR-lc
Endemism: Near-endemic
Distribution: wide

Monechma cleomoides (S.Moore) C.B.Clarke
Status: LR-lc
Endemism: Near-endemic
Distribution: North-West to South-West-Central

Monechma desertorum (Engl.) C.B.Clarke
Status: LR-lc
Endemism: Endemic
Distribution: Central to South

Monechma genistifolium (Engl.) C.B.Clarke subsp.
australe (P.G.Mey.) Munday
Status: LR-lc
Endemism: Near-endemic
Distribution: South-Central

Monechma genistifolium (Engl.) C.B.Clarke subsp.
genistifolium
Status: LR-lc
Distribution: Central

Monechma grandiflorum Schinz
Status: LR-lc
Endemism: Endemic
Distribution: Central

Monechma mollissimum (Nees) P.G.Mey.
Status: LR-lc
Endemism: Near-endemic
Distribution: South-West

Monechma salsola (S.Moore) C.B.Clarke
Status: LR-lc
Endemism: Near-endemic
Distribution: North

Monechma tonsum P.G.Mey.
Status: LR-lc
Endemism: Endemic
Distribution: North-West, North-Central

Peristrophe grandibracteata Lindau
Status: LR-lc
Endemism: Endemic
Distribution: Central

Peristrophe hereroensis (Schinz) K.Balkwill
Status: LR-lc
Endemism: Endemic
Distribution: Central

Peristrophe namibensis K.Balkwill subsp.
brandbergensis K.Balkwill
Status: LR-lc
Endemism: Endemic
Distribution: North-West-Central

Peristrophe namibensis K.Balkwill subsp.
namibensis
Status: LR-lc
Endemism: Endemic
Distribution: South-West-Central

Petalidium angustitubum P.G.Mey.
Status: LR-lc
Endemism: Near-endemic
Distribution: North-West

Petalidium bracteatum Oberm.
Status: LR-lc
Endemism: Near-endemic
Distribution: North-West

Petalidium canescens (Engl.) C.B.Clarke
Status: LR-lc
Endemism: Endemic
Distribution: Central

Petalidium cirrhiferum S.Moore
Status: LR-lc
Endemism: Near-endemic
Distribution: North-West

Petalidium coccineum S.Moore
Status: LR-lc
Endemism: Near-endemic
Distribution: North-West

Petalidium crispum A.Meeuse ex P.G.Mey.
Status: LR-lc
Endemism: Near-endemic
Distribution: North-West

Petalidium cymbiforme Schinz
Status: LR-lc
Endemism: Endemic
Distribution: South-West, South-Central

Petalidium engleranum (Schinz) C.B.Clarke
Status: LR-lc

Petalidium giessii P.G.Mey.
Status: LR-lc
Endemism: Endemic
Distribution: North-West

Petalidium halimoides (Nees) S.Moore
Status: LR-lc
Endemism: Near-endemic
Distribution: North-West

Petalidium lanatum (Engl.) C.B.Clarke
Status: LR-lc
Distribution: West-Central

Petalidium linifolium T.Anderson
Status: LR-lc
Endemism: Endemic
Distribution: South-West-Central, South-Central

Petalidium lucens Oberm.
Status: LR-lc
Endemism: Near-endemic
Distribution: South

Petalidium luteo-album A.Meeuse
Status: LR-lc
Endemism: Endemic
Distribution: North-West, West-Central

Petalidium pilosi-bracteolatum Merxm. & Hainz
Status: LR-lc
Endemism: Endemic
Distribution: North to Central

Petalidium ramulosum Schinz
Status: LR-lc
Endemism: Endemic
Distribution: North-Central

Petalidium rossmannianum P.G.Mey.
Status: LR-lc
Endemism: Near-endemic
Distribution: North-West, West-Central

Petalidium setosum C.B.Clarke ex Schinz
Status: LR-lc
Endemism: Near-endemic

Petalidium variabile (Engl.) C.B.Clarke

Status: LR-lc

Endemism: Near-endemic

Distribution: wide

Ruellia aspera (Schinz) Phillips

Status: LR-lc

Endemism: Endemic

Distribution: South-Central

Ruellia brandbergensis Kers

Status: LR-nt

Endemism: Endemic

Distribution: North-West-Central

Ruellia diversifolia S.Moore

Status: LR-lc

AIZOACEAE

Aizoanthemum dinteri (Schinz) Friedrich

Status: LR-lc

Endemism: Endemic

Distribution: North-West-Central

Aizoanthemum galenioides (Fenzl ex Sond.)

Friedrich

Status: LR-lc

Endemism: Endemic

Distribution: North-West-Central

Rore on sond near the coast in central Nomib.

Aizoanthemum membrum-connectens Dinter ex

Friedrich

Status: LR-lc

Endemism: Endemic

Distribution: North-West-Central

On sond generally near the coast.

Aizoon giessii Friedrich

Status: LR-lc

Endemism: Endemic

Distribution: Central

Galenia africana L.

Status: LR-lc

Galenia papulosa (Eckl. & Zeyh.) Sond.

Status: LR-lc

Tetragonia schenkii (Schinz) Engl.

Status: LR-lc

Endemism: Endemic

Distribution: South

Trianthema hereroensis Schinz

Status: LR-lc

Endemism: Endemic

Distribution: South-West-Central

Tribulocarpus dimorphanthus (Pax) S.Moore

Status: LR-lc

Endemism: Near-endemic

AMARANTHACEAE

Arthroa leubnitziae (Kuntze) Schinz

Status: LR-lc

Endemism: Endemic

Distribution: North-West-Central, North-West

Calicorema squarrosa (Schinz) Schinz

Status: LR-lc

Endemism: Endemic

Distribution: South

Hermbsdaetia argenteiformis Schinz

Status: LR-lc

Endemism: Near-endemic

Distribution: wide

Hermbsdaetia spathulifolia (Engl.) Baker

Status: LR-lc

Endemism: Endemic

Distribution: North-West-Central

Leucosphaera bainesii (Hook.f.) Gilg

Status: LR-lc

Marcellipsia denudata (Hook.f.) Schinz

Status: LR-lc

Endemism: Near-endemic

Marcellipsia splendens (Schinz) Schinz

Status: LR-lc

Endemism: Endemic

Distribution: Central

Marcellipsia welwitschii (Hook.f.) Schinz

Status: LR-lc

Endemism: Near-endemic

Sericocoma heterochiton Lopr.

Status: LR-lc

AMARYLLIDACEAE

Ammocharis nerinoides (Baker) Lehmillier

Status: LR-nt

Endemism: Endemic

Threats: Collection

Distribution: North-East, East-Central

Perhaps undercollected.

Boophane disticha (L.f.) Herb.

Status: LR-lc

Haemanthus coccineus L.

Status: LR-lc

Distribution: South-West

Nerine laticoma (Ker Gawl.) T.Durand & Schinz

Status: LR-lc

ANACARDIACEAE

Ozoroa concolor (C.Presl. ex Sond.) De Winter

Status: LR-lc

Endemism: Near-endemic

Distribution: South

Ozoroa dispar (C.Presl.) R.R. & A.Fern.

Status: LR-lc

Distribution: South-Central, South-East

Ozoroa longipes (Engl. & Gilg) R.R. & A.Fern.

Status: LR-lc

Distribution: North-East

Hos ethnobotanical use.

Ozoroa namaensis (Schinz & Dinter) R.Fern.

Status: LR-lc

Endemism: Near-endemic

Ozoroa schinzii (Engl.) R.R. & A.Fern.

Status: LR-lc

Endemism: Near-endemic

Distribution: North

Rhus problematoides Merxm. & Roessler

Status: LR-lc

Endemism: Endemic

Distribution: South-West-Central

ANNONACEAE

Friesodielsia obovata (Benth.) Verdc.

Status: LR-lc

Hexalobus monopetalus (A.Rich.) Engl. & Diels

var. *monopetalus*

Status: LR-lc

Distribution: North-West

Xylopia odoratissima Welw. ex Oliv.

Status: LR-lc

Distribution: Caprivi

APIACEAE

Heteromorpha papillosa C.C.Towns.

Status: LR-lc

Endemism: Endemic

Distribution: Central

Phlyctidocarpa flava Cannon & Theobald

Status: LR-lc

Endemism: Endemic

Distribution: North-West

APOCYNACEAE

Adenium boehmianum Schinz

Status: LR-lc

Distribution: North

Baissea wulfhorstii Schinz

Status: LR-lc

Brachystelma blepharathera H.E.Huber

Status: LR-lc

Endemism: Endemic

Distribution: wide

Brachystelma circinatum E.Mey.

Status: LR-nt

Threats: Grazing/browsing

Distribution: North-East, East-Central

Usually in the open amongst tufts of grass between trees.

Brachystelma cupulatum R.A.Dyer

Status: LR-nt

Probably undercollected and confused, but is common and may be more widespread.

Brachystelma dinteri Schltr.

Status: LR-lc

Threats: Collection

Distribution: Central to East

Very variable in habitat preferences. Often overlooked as it is inconspicuous; the leaves could be mistaken for other herbs.

Brachystelma gymnopodium (Schltr.) Bruyns

Status: LR-lc

Brachystelma stenophyllum (Schltr.) R.A.Dyer

Status: LR-nt

Threats: Grazing/browsing

Distribution: Central

Inconspicuous plant that grows close to or underneath bushes, some in grass clumps.

Carissa haematocarpa (Eckl.) A.DC.

Status: LR-lc

Distribution: South

Ceropegia lugardiae N.E.Br.

Status: LR-lc

Threats: Collection

Distribution: Central, East-Central, North-East

Striking and vigorous.

Ceropegia multiflora Baker subsp. *tentaculata*

(N.E.Br.) H.E.Huber

Status: LR-lc

Threats: Collection

Ceropegia nilotica* Kotschy*Status:** LR-lc**Threats:** Collection

Moist orens with thick bushes and deep soil, but confined to the thickest bushes. Rather attractive flower.

Ceropegia purpurascens* K.Schum.*Status:** LR-nt**Threats:** Habitat degradation, urban expansion, collection**Distribution:** Caprivi

Prefers very dense bush and forest in wet orens.

Ceropegia rocemosa* N.E.Br. subsp. *setifera**(Schltr.) H.E.Huber****Status:** LR-nt**Threats:** Collection

Occurs on limestone, dolomite or granite outcrops. Namibian specimens deviate from the South African form. The species is similar to *Pentarrhinum insipidum* vegetatively and may be undercollected.

Ceropegia stenolobo* Hochst. ex Chiov.*Status:** LR-nt**Threats:** Collection**Distribution:** Central

Can be confused with *Pentarrhinum insipidum* vegetatively. Odd combination of features for the genus.

Cynanchum meyeri* (Decne.) Schltr.*Status:** LR-nt**Endemism:** Endemic**Threats:** Mining**Distribution:** South-West

Not directly threatened because of its remote habitat.

Cynonchum orangeonum* (Schltr.) N.E.Br.*Status:** LR-lc***Duvalia maculata* N.E.Br.****Status:** LR-nt**Endemism:** Near-endemic**Distribution:** Central***Duvolia polito* N.E.Br.****Status:** LR-lc**Threats:** Collection

Widespread and variable.

Ectadium latifolium* (Schinz) N.E.Br.*Status:** LR-lc**Endemism:** Endemic**Threats:** Mining**Distribution:** South***Ectodium rotundifolium* (H.Huber) Venter & Kotze****Status:** LR-lc**Endemism:** Endemic**Distribution:** North-West***Ectadium virgotum* E.Mey.****Status:** LR-lc**Endemism:** Near-endemic**Distribution:** South-West, South-West-Central***Gomphocarpus filiformis* (E.Mey.) Dietr.****Status:** LR-lc***Gomphocarpus rostratus* (N.E.Br.) Bullock****Status:** LR-nt**Threats:** Habitat degradation**Distribution:** North-East

Not collected since the 1950s; could be undercollected and missed because of growing in the grassveld.

Gomphocarpus tomentosus* Burch.*Status:** LR-lc***Hoodia currorii* (Hook.) Decne. subsp. *currorii*****Status:** LR-lc**Endemism:** Near-endemic**Threats:** Collection**Distribution:** wide

Is cultivated.

Hoodia flovo* (N.E.Br.) Plowes*Status:** LR-nt**Endemism:** Near-endemic**Threats:** Grazing/browsing, collection**Distribution:** South-East***Hoodia gordonii* (Masson) Sweet ex Decne.****Status:** LR-lc**Threats:** Grazing/browsing, collection**Distribution:** wide***Hoodia porviflora* N.E.Br.****Status:** LR-lc**Endemism:** Near-endemic**Distribution:** North-West***Lovronia morlothii* (N.E.Br.) Bruyns****Status:** LR-lc**Threats:** Collection***Lovrania picta* (N.E.Br.) Bruyns subsp. *picta*****Status:** LR-nt**Threats:** Collection***Microloma colycinum* E.Mey. subsp. *calycinum*****Status:** LR-lc**Endemism:** Near-endemic**Distribution:** South-West

Dry, rocky slopes.

Microloma hereroense* Wanntorp*Status:** LR-lc**Endemism:** Endemic**Distribution:** North-West-Central

High orens only.

Microloma incanum* Decne.*Status:** LR-lc**Endemism:** Near-endemic***Microloma longitubum* Schltr.****Status:** LR-lc

Wide and disjunct distribution.

Microloma penicillotum* Schltr.*Status:** LR-lc**Endemism:** Endemic**Threats:** Mining**Distribution:** South-West***Orthanthera albida* Schinz****Status:** LR-lc**Endemism:** Near-endemic***Orthanthera josminiflora* (Decne.) Schinz****Status:** LR-lc***Pachypodium lealii* Welw.****Status:** LR-lc**Endemism:** Near-endemic**Threats:** Grazing/browsing, collection**Distribution:** North***Pachypodium namaquanum* (Wyley ex Harv.)****Welw.****Status:** LR-nt**Endemism:** Near-endemic**Threats:** Mining, collection**Distribution:** South

One of the two subpopulations assessed in two localities looked healthy, except for low regeneration/recruitment—young plants were not common. Ten other known subpopulations were not visited.

Pentarrhinum abyssinicum* Decne. subsp.*abyssinicum****Status:** LR-lc***Pentarrhinum abyssinicum* Decne. subsp.****angolense** (N.E.Br.) Liede & Nicholas**Status:** LR-lc***Pentarrhinum insipidum* E.Mey.****Status:** LR-lc***Pergularia daemia* (Forssk.) Chiov. var. *leiocarpa*****(K.Schum.) H.E.Huber****Status:** LR-lc***Pergularia doemio* (Forssk.) Chiov. var. *doemia*****Status:** LR-lc***Piarranthus decorus* (Masson) N.E.Br. subsp.****cornutus** (N.E.Br.) Meve**Status:** LR-lc***Quoqua mommilloris* (L.) Bruyns****Status:** LR-nt**Threats:** Mining, collection**Distribution:** South***Sarcostemma pearsonii* N.E.Br.****Status:** LR-lc**Endemism:** Near-endemic**Distribution:** wide, mainly South***Sarcostemma viminale* (L.) R.Br. subsp. *thunbergii*****(Don) Liede & Meve****Status:** LR-lc***Sarcostemma viminale* (L.) R.Br. subsp. *viminale*****Status:** LR-lc***Stapelio flovopurpureo* Marloth****Status:** LR-nt**Threats:** Collection**Distribution:** South-Central, Central***Stapelia goriepensis* Pillans****Status:** LR-nt**Endemism:** Near-endemic**Threats:** Mining, collection***Stapelio kwebensis* N.E.Br.****Status:** LR-lc**Threats:** Collection***Stapelia longipedicellata* (A.Berger) N.E.Br.****Status:** LR-lc**Endemism:** Endemic**Threats:** Collection**Distribution:** wide

Very smelly.

Stapelio schinzii* A.Berger & Schltr. var. *schinzii**Status:** LR-lc**Endemism:** Endemic**Threats:** Collection***Stigmatorhynchus hereroensis* Schltr.****Status:** LR-lc**Endemism:** Endemic**Distribution:** North***Strophanthus amboensis* (Schinz) Engl. & Pax****Status:** LR-lc**Endemism:** Near-endemic**Distribution:** North-West, North-West-Central, Central***Tridentea marientalensis* (Nel) L.C.Leach subsp.****olbipilosa** (Giess) L.C.Leach**Status:** LR-nt**Endemism:** Endemic**Threats:** Collection**Distribution:** South-Central, South-East***Tridentea marientalensis* (Nel) L.C.Leach subsp.****marientalensis****Status:** LR-lc**Endemism:** Near-endemic**Threats:** Collection**Distribution:** South-East

Tylophora fleckii (Schltr.) N.E.Br.

Status: LR-lc

Endemism: Endemic

Distribution: wide

ASPHODELACEAE

Aloe asperifolia A.Berger

Status: LR-lc

Endemism: Endemic

Threats: Habitat degradation, collection

Distribution: North-West, Caprivi

Could be confused with *A. pachygaster* and *A. claviflora*.

Aloe claviflora Burch.

Status: LR-nt

Threats: Mining, collection

Distribution: South-East

May be confused with *A. pachygaster*.

Aloe dichotoma Masson

Status: LR-lc

Endemism: Near-endemic

Distribution: South to North-West-Central

Aloe esculenta L.C.Leach

Status: LR-lc

Threats: Habitat degradation, urban expansion, collection

Distribution: Central, East

Flowers eaten.

Aloe gariepensis Pillans

Status: LR-nt

Endemism: Near-endemic

Threats: Collection

Distribution: South

Aloe hereroensis Engl. var. *hereroensis*

Status: LR-lc

Aloe hereroensis Engl. var. *lutea* A.Berger

Status: LR-lc

Aloe littoralis Baker

Status: LR-lc

Aloe striata Haw. subsp. *karasbergensis* (Pillans)

Glen & D.S.Hardy

Status: LR-nt

Endemism: Near-endemic

Threats: Habitat degradation, collection

Distribution: South-Central

Evidence of illegal collecting was found.

Aloe variegata L.

Status: LR-nt

Threats: Collection

Distribution: South-West

Small plant 10–15 cm. Relatively common in the south.

Aloe zebrina Baker

Status: LR-lc

Threats: Collection

Trachyandra ensifolia (Sölch) Roessler

Status: LR-nt

Endemism: Endemic

Distribution: South

ASTERACEAE

Anisopappus pinnatifidus (Klatt) O.Hoffm. ex Hutch.

Status: LR-lc

Endemism: Endemic

Distribution: wide

Antiphona fragrans (Merxm.) Merxm.

Status: LR-lc

Endemism: Endemic

Distribution: North-West-Central, North

Antiphona pinnatisecta (S.Moore) Merxm.

Status: LR-lc

Endemism: Endemic

Distribution: wide

Arctotis leiocarpa Harv.

Status: LR-lc

Berkheya schinzii O.Hoffm.

Status: LR-lc

Endemism: Endemic

Distribution: South

Calostephane marlothiana O.Hoffm.

Status: LR-lc

Endemic

Distribution: wide, mainly West

Crassocephalum coeruleum (O.Hoffm.) R.E.Fr.

Status: LR-lc

Endemism: Endemic

Distribution: Central

Didelta carnosa (L.f.) Aiton var. *carnosa*

Status: LR-lc

Endemism: Near-endemic

Didelta spinosa (L.f.) Aiton

Status: LR-lc

Endemism: Near-endemic

Distribution: South-West

Eriocephalus ambiguus (DC.) M.A.N.Müller

Status: LR-lc

Undercollected.

Eriocephalus dinteri S.Moore

Status: LR-lc

Endemism: Endemic

Distribution: South-West-Central, South-Central, South-East

Restricted to high mountains above 1,000 m.

Eriocephalus giessii M.A.N.Müller

Status: LR-lc

Endemism: Endemic

Threats: Mining

Distribution: South-West

In mountainous areas over 1,000 m above sea level.

Eriocephalus kingesii Merxm. & Eberle

Status: LR-nt

Endemism: Endemic

Threats: Mining

Distribution: South-West

Occurs mainly near the coast.

Eriocephalus pauperrimus Merxm. & Eberle

Status: LR-lc

Distribution: South-Central, South-East

Undercollected.

Eriocephalus pinnatus O.Hoffm.

Status: LR-lc

Endemism: Endemic

Threats: Browsing

Distribution: North-West, North-West-Central

Unique in the genus.

Eriocephalus scariosus DC.

Status: LR-lc

Endemism: Near-endemic

Felicia smaragdina (S.Moore) Merxm.

Status: LR-lc

Endemism: Endemic

Distribution: wide, mainly South

Geigeria acaulis Benth. & Hook.f. ex Oliv. & Hiern

Status: LR-lc

Geigeria alata (DC.) Benth. & Hook.f. ex Oliv. & Hiern

Status: LR-lc

Helichrysum tomentosulum (Klatt) Merxm. subsp. *aromaticum* (Dinter) Merxm.

Status: LR-lc

Endemism: Near-endemic

Lasiopogon volkii (B.Nord.) Hilliard

Status: LR-lc

Endemism: Endemic

Distribution: South

Myxopappus hereroensis (O.Hoffm.) Källersjö

Status: LR-lc

Endemism: Endemic

Distribution: North-West-Central, North

Ondetia linearis Benth.

Status: LR-lc

Endemism: Endemic

Distribution: Central, North

Osteospermum montanum Klatt

Status: LR-lc

Endemism: Endemic

Distribution: Central

Osteospermum muricatum E.Mey. ex DC. subsp. *longiradiatum* Norl.

Status: LR-lc

Endemism: Endemic?

Distribution: Central

Othonna brandbergensis B.Nord.

Status: LR-nt

Endemism: Endemic

Distribution: North-West-Central

On high areas of mountains only and may therefore be more widespread. Very fragmented distribution.

Othonna graveolens O.Hoffm.

Status: LR-nt

Endemism: Endemic?

Threats: Mining

Distribution: South-West

Othonna lasiocarpa (DC.) Sch.Bip.

Status: LR-lc

Threats: Collection

Distribution: West to South

Good subject for bonsai.

Othonna protecta Dinter

Status: LR-lc

Threats: Collection

Distribution: West

Othonna sparsiflora (S.Moore) B.Nord.

Status: LR-lc

Endemism: Endemic?

Threats: Mining, collection

Distribution: South-West

Pegolettia oxyodonta DC.

Status: LR-lc

Endemism: Near-endemic

Pegolettia pinnatilobata (Klatt) O.Hoffm. ex Dinter

Status: LR-lc

Endemism: Endemic

Distribution: wide

Pegolettia plumosa M.D.Hend.

Status: LR-nt

Endemism: Endemic

Distribution: mainly South

May be more widespread than specimens indicate.

Pegolettia retrofracta (Thunb.) Kies
Status: LR-lc

Pegolettia senegalensis Cass.
Status: LR-lc

Pteronia eenii S.Moore
Status: LR-lc
Endemism: Endemic
Distribution: Central

Pteronia polygalifolia O.Hoffm.
Status: LR-lc
Endemism: Endemic
Distribution: South-West-Central, South-Central

Rennera eenii (S.Moore) Källersjö
Status: LR-nt
Endemism: Endemic
Distribution: Central, East-Central
Used as chomomile.

Rennera limnophila Merxm.
Status: LR-lc
Endemism: Near-endemic

Senecio alliariifolius O.Hoffm.
Status: LR-lc
Endemism: Endemic
Distribution: North-West

Senecio engleranus O.Hoffm.
Status: LR-lc
Endemism: Endemic
Distribution: wide, mainly West

Senecio giessii Merxm.
Status: LR-lc
Endemism: Endemic
Distribution: South-Central

Tripteris nervosa Hutch.
Status: LR-lc
Endemism: Endemic
Distribution: wide

Vernonia obionifolia O.Hoffm. subsp. *dentata*
Merxm.
Status: LR-lc
Endemism: Endemic

Vernonia obionifolia O.Hoffm. subsp. *obionifolia*
Status: LR-lc
Endemism: Endemic

BALANITACEAE

Balanites welwitschii (Tiegh.) Exell & Mendonça
Status: LR-lc
Endemism: Near-endemic
Distribution: North-West

BIGNONIACEAE

Catophractes alexandri D.Don
Status: LR-lc

Rhizomum virgatum Merxm. & A.Schreib.
Status: LR-lc
Endemism: Near-endemic
Distribution: North-West

BORAGINACEAE

Cordia grandicalyx Oberm.
Status: LR-lc

Cordia monoica Roxb.
Status: LR-lc

Cordia sinensis Lam.
Status: LR-lc
Distribution: Caprivi

BRASSICACEAE

Heliophila carnosa (Thunb.) Steud.
Status: LR-lc

Heliophila cornuta Sond. var. *squamata* (Schltr.)
Marais
Status: LR-lc

Heliophila deserticola Schltr. var. *deserticola*
Status: LR-lc

Sisymbrium burchellii DC. var. *burchellii*
Status: LR-lc

BURSERACEAE

Commiphora africana (A.Rich.) Engl.
Status: LR-lc

Commiphora anacardiifolia Dinter & Engl.
Status: LR-lc
Endemism: Near-endemic
Threats: Collection
Distribution: North-West

Commiphora capensis (Sond.) Engl.
Status: LR-lc
Endemism: Near-endemic
Distribution: South

Commiphora cervifolia J.J.A.van der Walt
Status: LR-nt
Endemism: Near-endemic
Threats: Collection
Distribution: South
Is sought-after for gordens. Not common.

Commiphora crenato-serrata Engl.
Status: LR-lc
Endemism: Near-endemic
Distribution: North-West

Commiphora dinteri Engl.
Status: LR-lc
Endemism: Endemic
Distribution: West

Commiphora discolor Mendes
Status: LR-lc
Endemism: Near-endemic
Threats: Collection
Distribution: North-West

Commiphora edulis (Klotzsch) Engl.
Status: LR-lc
Occasional in riverbank (Zombezi) bush.

Commiphora giessii J.J.A.van der Walt
Status: LR-lc
Endemism: Endemic
Distribution: North-West

Commiphora glandulosa Schinz
Status: LR-lc

Commiphora glaucescens Engl.
Status: LR-lc
Endemism: Near-endemic

Commiphora gracilifrons Dinter ex J.J.A.van der Walt
Status: LR-nt
Endemism: Near-endemic
Threats: Mining, collection
Distribution: South-West
Sought-after for gordens, not common.

Commiphora krauseliana Heine
Status: LR-lc
Endemism: Endemic
Threats: Collection
Distribution: North-West, North-West-Central

Commiphora mollis (Oliv.) Engl.
Status: LR-lc
Distribution: Caprivi

Commiphora multifuga (Hiern) K.Schum.
Status: LR-lc
Endemism: Near-endemic
Distribution: North-West

Commiphora namaensis Schinz
Status: LR-lc
Endemism: Near-endemic
Distribution: North-West-Central, South-East

Commiphora oblancoolata Schinz
Status: LR-nt
Endemism: Near-endemic
Distribution: North-West, North-West-Central
Hos fragmented distribution and is not common where it occurs.

Commiphora pyracanthoides Engl.
Status: LR-lc

Commiphora saxicola Engl.
Status: LR-lc
Endemism: Endemic
Distribution: West

Commiphora tenuipetiolata Engl.
Status: LR-lc

Commiphora virgata Engl.
Status: LR-lc
Endemism: Endemic
Distribution: North-West, North-West-Central

Commiphora wildii Merxm.
Status: LR-lc
Endemism: Near-endemic
Distribution: North-West, North-West-Central

CAMPANULACEAE

Wahlenbergia androsacea A.DC.
Status: LR-lc

Wahlenbergia erophiloides Markgr.
Status: LR-nt
Endemism: Endemic
Threats: Mining
Distribution: South-West
Could be overlooked and is probably more widespread.

CAPPARACEAE

Boscia angustifolia A.Rich. var. *corymbosa* (Gilg)
DeWolf
Status: LR-nt
Distribution: Caprivi
Very few specimens and small distribution.

Boscia microphylla Oliv.
Status: LR-lc
Endemism: Near-endemic
Distribution: North-West

Boscia tomentosa Toelken
Status: LR-nt
Endemism: Near-endemic
Distribution: North-West
May be undercollected.

Cadaba aphylla (Thunb.) Wild
Status: LR-lc

Cadaba schroepelii Suess.
Status: LR-lc
Endemism: Near-endemic
Distribution: North-West, North-West-Central

Capparis hereroensis Schinz
Status: LR-lc
Endemism: Endemic?
Distribution: South-West-Central

Capparis tomentosa Lam.
Status: LR-lc
Distribution: North-East
Not many specimens and collected decades ago.

Cleome carnasa (Pax) Gilg & Benedict
Status: LR-lc
Endemism: Endemic
Distribution: North-West-Central

Maerua angolensis DC.
Status: LR-lc

Maerua gilgii Schinz
Status: LR-lc
Endemism: Near-endemic
Distribution: South-West

Maerua juncea Pax subsp. *juncea*
Status: LR-lc

Maerua parvifolia Pax
Status: LR-lc

Maerua schinzii Pax
Status: LR-lc

CARYOPHYLLACEAE

Dianthus namaensis Schinz var. *dinteri* (Schinz) Hooper
Status: LR-lc
Endemism: Near-endemic

CELASTRACEAE

Gymnasparia gariepensis M.Jordaan ined.
Status: LR-lc
Endemism: Near-endemic

Gymnosporia linearis (L.f.) Loes. subsp. *lanceolata* (E.Mey. ex Sond.) M.Jordaan ined.
Status: LR-lc
Endemism: Near-endemic

Gymnasparia syzyziolowiczii (Kuntze) M.Jordaan subsp. *namibensis* M.Jordaan ined.
Status: LR-lc
Endemism: Near-endemic

CHENOPODIACEAE

Atriplex amboensis Schinz
Status: LR-lc

Laphiocarpus latifolius Nowicke
Status: LR-lc

Lophiocarpus palystachyus Turcz.
Status: LR-lc

Lophiocarpus tenuissimus Hook.f.
Status: LR-lc

Suaeda articulata Aellen
Status: LR-lc
Endemism: Endemic
Distribution: North

COLCHICACEAE

Hexacyrtis dickiana Dinter
Status: LR-lc
Endemism: Near-endemic

Ornithoglossum calcicola K.Krause & Dinter
Status: LR-lc
Endemism: Endemic
Distribution: North, Central
Paisanaus.

COMBRETACEAE

Combretum albopunctatum Suess.
Status: LR-lc
Distribution: North-East

Combretum elaeagnoides Klotzsch
Status: LR-lc
Distribution: North-East

Combretum psidioides Welw. subsp. *dinteri* (Schinz) Exell
Status: LR-lc

Combretum wattii Exell
Status: LR-lc
Endemism: Near-endemic

CONNARACEAE

Rourea orientalis Baill.
Status: LR-lc
Distribution: Caprivi

CONVOLVULACEAE

Merremia bipinnatifida (Engl.) Hallier f.
Status: LR-lc
Endemism: Endemic
Distribution: North-West-Central

Merremia guerichii A.Meeuse
Status: LR-lc
Endemism: Endemic
Distribution: North-West, Central

Seddera schizantha Hallier f.
Status: LR-lc
Endemism: Near-endemic

CRASSULACEAE

Crassula brevifolia Harv. subsp. *brevifolia*
Status: LR-nt
Endemism: Near-endemic
Threats: Mining, collection
Distribution: South-West

Crassula elegans Schonland & Baker f. subsp. *elegans*
Status: LR-lc
Endemism: Near-endemic
Threats: Collection
Distribution: South-West
On soil and quartzite.

Crassula fusca A.G.J.Herre
Status: LR-nt
Endemism: Near-endemic
Threats: Collection
Distribution: South-West

Crassula lanceolata (Eckl. & Zeyh.) Endl. ex Walp. subsp. *transvaalensis* (Kuntze) Toelken
Status: LR-lc

Crassula macawaniana Schonland & Baker f.
Status: LR-nt
Endemism: Near-endemic
Threats: Mining, collection
Distribution: South-West

Crassula muscaca L. var. *muscaca*
Status: LR-lc

Crassula rhadesica (Merxm.) Wickens & Bywater
Status: LR-lc

Tylecodon paniculatus (L.f.) Toelken
Status: LR-nt
Threats: Collection
Distribution: South
Hybridises easily.

Tylecadan rubravenosus (Dinter) Toelken
Status: LR-lc
Endemism: Near-endemic
Many juveniles seen.

Tylecodon schaeferianus (Dinter) Toelken
Status: LR-nt
Endemism: Near-endemic
Threats: Mining, collection
Distribution: South-West
Grows in sun on low to high rock outcrops and inselbergs.

CUCURBITACEAE

Acanthascias harridus Welw. ex Hook.f.
Status: LR-lc
Endemism: Near-endemic
Distribution: West

Acanthascias naudinianus (Sond.) C.Jeffrey
Status: LR-lc

Citrullus ecirrhatus Cogn.
Status: LR-lc
Endemism: Near-endemic

Citrullus rehmi De Winter
Status: LR-lc
Endemism: Endemic
Distribution: wide, mainly West

Carallocarpus schinzii Cogn.
Status: LR-lc
Endemism: Near-endemic

Dactyliandra welwitschii Hook.f.
Status: LR-lc
Endemism: Near-endemic

Momordica welwitschii Hook.f.
Status: LR-lc
Endemism: Near-endemic

CYPERACEAE

Balbaschoenus nabilis (Ridl.) Goetgh. & Simpson
Status: LR-lc
Endemism: Near-endemic
Needs permanent water.

DRACAENACEAE

Sansevieria pearsanii N.E.Br.
Status: LR-lc

EBENACEAE

Diaspyros acockii (De Winter) De Winter
Status: LR-lc
Endemism: Near-endemic

Distribution: North-West-Central, South-East
Incorrectly identified.

Diospyros chamaethamnus Dinter ex Mildbr.
Status: LR-lc
Forms colonies covering large oreos. *Hos ethnobotanical*
use.

Diospyros virgata (Gürke) Brenan
Status: LR-lc
Distribution: North-East

Euclea asperima Friedr.-Holzh.
Status: LR-nt
Endemism: Endemic
Distribution: South-West

ELATINACEAE

Bergia glutinosa Dinter & Schulze-Menz
Status: LR-lc
Endemism: Near-endemic

ERIOSPERMACEAE

Eriospermum bakerianum Schinz subsp.
bakerianum
Status: LR-lc

Eriospermum bakerianum Schinz subsp. *tortuosum*
(Dammer) P.L. Perry
Status: LR-lc

Eriospermum mackenii (Hook.f.) Baker subsp.
galpinii (Schinz) P.L.Perry
Status: LR-lc

Eriospermum rautanenii Schinz
Status: LR-lc

Eriospermum roseum Schinz
Status: LR-lc
Endemism: Near-endemic

EUPHORBIACEAE

Euphorbia avasmontana Dinter
Status: LR-lc

Euphorbia caperonioides R.A.Dyer & P.G.Mey.
Status: LR-nt
Endemism: Endemic
Distribution: North-West
May be undercollected.

Euphorbia chamaesycooides B.Nord.
Status: LR-nt
Endemism: Endemic

Euphorbia chersina N.E.Br.
Status: LR-lc
Endemism: Near-endemic
Threats: Collection
Distribution: South-West

Euphorbia crotonoides Boiss.
Status: LR-lc

Euphorbia damarana L.C.Leach
Status: LR-lc
Endemism: Endemic
Threats: Collection
Distribution: South-West-Central

Euphorbia decussata E.Mey. ex Boiss.
Status: LR-lc
Endemism: Near-endemic
Threats: Collection

Euphorbia dregeana E.Mey. ex Boiss.
Status: LR-lc

Endemism: Near-endemic
Threats: Collection

Euphorbia ephedroides E.Mey ex Boiss. var.
ephedroides
Status: LR-nt
Endemism: Near-endemic
Threats: Collection

Euphorbia forskalii J.Gay, Webb & Berthel.
Status: LR-lc

Euphorbia gariepina Boiss. subsp. *balsamea*
(Welw. ex Hiern) L.C.Leach
Status: LR-lc
Threats: Collection

Euphorbia gariepina Boiss. subsp. *gariepina*
Status: LR-lc
Threats: Collection

Euphorbia giessii L.C.Leach
Status: LR-lc
Endemism: Endemic
Threats: Collection
Distribution: South-West-Central

Euphorbia glanduligera Pax
Status: LR-lc

Euphorbia gregaria Marloth
Status: LR-lc
Endemism: Near-endemic
Threats: Collection

Euphorbia guerichiana Pax
Status: LR-lc
Threats: Collection

Euphorbia gummifera Boiss.
Status: LR-nt
Endemism: Near-endemic
Threats: Collection

Euphorbia hamata (Haw.) Sweet
Status: LR-nt
Endemism: Near-endemic
Threats: Collection

Euphorbia insarmentosa P.G.Mey.
Status: LR-nt
Endemism: Endemic
Distribution: North-West

Euphorbia juttiae Dinter
Status: LR-nt
Endemism: Endemic
Distribution: South-West, South-West-Central

Euphorbia lignosa Marloth
Status: LR-lc
Endemism: Near-endemic
Threats: Collection
Distribution: wide

Euphorbia monteiroi Hook.f. subsp. *monteiroi*
Status: LR-lc
Threats: Collection

Euphorbia phylloclada Boiss.
Status: LR-lc

Euphorbia rudis N.E.Br.
Status: LR-nt
Endemism: Endemic
Threats: Collection

Euphorbia transvaalensis Schltr.
Status: LR-lc
Threats: Collection

Euphorbia virosa Willd.
Status: LR-lc
Threats: Collection

Jatropha orangeana Dinter ex P.G.Mey.
Status: LR-lc
Endemism: Near-endemic
Distribution: South-Central, South-East

FABACEAE

Acacia hebeclada DC. subsp. *tristis* A.Schreib.
Status: LR-lc

Acacia mellifera (Vahl) Benth. subsp. *mellifera*
Status: LR-lc

Acacia montis-usti Merxm. & A.Schreib.
Status: LR-lc
Endemism: Endemic
Distribution: North-West

Acacia nebrownii Burtt Davy
Status: LR-lc

Acacia robynsiana Merxm. & A.Schreib.
Status: LR-lc
Endemism: Near-endemic
Distribution: North-West

Acacia senegal (L.) Willd. var. *rostrata* Brenan
Status: LR-lc

Adenolobus pechuelii (Kuntze) Torre & Hillc.
subsp. *mossamedensis* (Torre & Hillc.) Brummitt &
J.H.Ross
Status: LR-lc
Endemism: Near-endemic

Adenolobus pechuelii (Kuntze) Torre & Hillc.
subsp. *pechuelii*
Status: LR-lc
Endemism: Near-endemic
Distribution: North-West, North-West-Central

Albizia antunesiana Harms
Status: LR-lc

Amblygonocarpus andongensis (Welw. ex Oliv.)
Exell & Torre
Status: LR-lc

Bobgunnia madagascariensis (Desv.) J.H.Kirkbr. &
Wiersema
Status: LR-lc

Caesalpinia pearsonii L.Bolus
Status: LR-lc
Endemism: Endemic
Distribution: South-West-Central
Common and fairly widespread.

Caesalpinia rubra (Engl.) Brenan
Status: LR-lc
Endemism: Near-endemic

Crotalaria laburnifolia L. subsp. *australis* (Baker
f.) Polhill
Status: LR-lc
Distribution: Caprivi

Cullen biflora (Harv.) C.H.Stirt.
Status: LR-lc
Endemism: Near-endemic

Cyamopsis serrata Schinz
Status: LR-lc

Dichrostachys cinerea (L.) Wight & Arn. subsp.
africana Brenan & Brummitt var. *africana*
Status: LR-lc

Entada arenaria Schinz subsp. *arenaria*
Status: LR-lc
Distribution: Caprivi

Erythrina decara Harms

Status: LR-lc

Endemism: Endemic

Erythrophleum africanum (Welw. ex Benth.)

Harms

Status: LR-lc

Faidherbia albida (Delile) A.Chev.

Status: LR-lc

Haemataxylum dinteri (Harms) Harms

Status: LR-lc

Endemism: Endemic

Distribution: South-Central

Seeds were collected for research on biological control of *Caesalpinia decapetala*. It is common and seeds are plentiful.

Indigofera adenoides Baker f.

Status: LR-lc

Indigofera astragalina DC.

Status: LR-lc

Indigofera baumiana Harms

Status: LR-lc

Indigofera demissa Taub.

Status: LR-lc

Indigofera filipes Benth. ex Harv.

Status: LR-lc

Indigofera flavicans Baker var. *flavicans*

Status: LR-lc

Indigofera gairdneriae Hutch. ex Baker f.

Status: LR-lc

Indigofera heteratricha DC.

Status: LR-lc

Indigofera halubii N.E.Br.

Status: LR-lc

Indigofera inhambanensis Klotzsch

Status: LR-lc

Indigofera nicaulensis E.Mey.

Status: LR-lc

Endemism: Near-endemic

Indigofera nummularifolia (L.) Liv. ex Alston

Status: LR-lc

Indigofera pechuelii Kuntze

Status: LR-lc

Endemism: Endemic

Distribution: wide

Indigofera rautanenii Baker f.

Status: LR-lc

Endemism: Endemic

Distribution: Central

Lebeckia halenbergensis Merxm. & A.Schreib.

Status: LR-nt

Endemism: Near-endemic

Threats: Mining

Distribution: South-West

Confined to winter-rainfall area where mining is on the increase.

Lessertia acantharhachis (Dinter) Dinter

Status: LR-nt

Endemism: Endemic

Threats: Mining

Distribution: South-West

On outcrops in dunes.

Lessertia eremicola Dinter

Status: LR-nt

Endemism: Endemic

Threats: Mining

Distribution: South-West

Lotononis bainesii Baker

Status: LR-lc

Known from three specimens only.

Latonanis bracteosa B.-E.van Wyk

Status: LR-lc

Endemism: Endemic

Distribution: North-West, North-West-Central

Previously misidentified.

Latananis platycarpa (Viv.) Pic.Serm.

Status: LR-lc

Most widespread of genus.

Latananis schreiberi B.-E.van Wyk

Status: LR-lc

Endemism: Endemic

Distribution: North-West-Central

Lotononis strigillosa (Merxm. & A.Schreib.)

A.Schreib.

Status: LR-lc

Endemism: Near-endemic

Distribution: South-West

Winter-rainfall region.

Lotononis tenuis Baker

Status: LR-nt

Endemism: Near-endemic

Distribution: North-West

Known from two specimens only.

Mimosa pigra L.

Status: LR-lc

Nearautanenia ambaensis Schinz

Status: LR-lc

Neptunia aleracea Lour.

Status: LR-lc

Ormocarpum kirkii S.Moore

Status: LR-lc

Distribution: North-East

Peltophorum africanum Sond.

Status: LR-lc

Sesbania micraphylla Harms ex E.Phillips & Hutch.

Status: LR-lc

Sesbania pachycarpa DC. subsp. *dinterana*

J.B.Gillett

Status: LR-lc

Endemism: Endemic

Distribution: wide

Tephrosia monophylla Schinz

Status: LR-lc

Endemism: Endemic

Distribution: North

FLACOURTIACEAE

Flacourtia indica (Burm.f.) Merr.

Status: LR-lc

Distribution: Caprivi

Hamalium abdessammadii Asch. & Schweinf.

Status: LR-lc

Oncoba spinosa Forssk.

Status: LR-lc

Distribution: North-East

FRANKENIACEAE

Frankenia pamanensis Pohnert

Status: LR-nt

Endemism: Endemic

Threats: Mining

Distribution: South-West

Has been recorded at old mine site, so appears to be able to grow on disturbed areas along the coast.

GERANIACEAE

Pelarganium otaviense R.Knuth

Status: LR-lc

Endemism: Endemic

Distribution: wide

Sarcocaulan inerme Rehm

Status: LR-lc

Endemism: Endemic

Distribution: South

Sarcocaulon marlothii Engl.

Status: LR-lc

Endemism: Endemic

Distribution: wide

Sarcocaulon mossamedense (Welw. ex Oliv.) Hiern

Status: LR-lc

Endemism: Near-endemic

Distribution: North-West

Sarcocaulon patersonii (DC.) G.Don

Status: LR-lc

Endemism: Near-endemic

Distribution: South-West

HYACINTHACEAE

Lachenalia giessii W.F.Barker

Status: LR-lc

Endemism: Endemic

Threats: Mining, collection

Distribution: South

Ornithogalum candidum Oberm.

Status: LR-lc

Endemism: Endemic

Distribution: Central, South-West-Central

Ornithogalum glandulosum Oberm.

Status: LR-nt

Endemism: Near-endemic

Distribution: South-West

Ornithogalum nanades F.M.Leight.

Status: LR-nt

Endemism: Near-endemic

Distribution: South-West

Very small geophyte.

Ornithogalum ornithogalaides (Kunth) Oberm.

Status: LR-lc

Distribution: East-Central

Ornithogalum pulchrum Schinz

Status: LR-lc

Ornithogalum rautanenii Schinz

Status: LR-lc

Endemism: Endemic

Distribution: North

Grows near waterholes so may be threatened by transformation of the area.

Ornithogalum seineri (Engl. & K.Krause) Oberm.

Status: LR-lc

Ornithogalum stapffii Schinz

Status: LR-lc

Endemism: Endemic

Distribution: wide

Ornithogalum subcoriaceum L.Bolus

Status: LR-lc

Distribution: South-West

Ornithogalum toxicarium C.Archer & R.H.Archer

Status: LR-lc

Ornithogalum tubiforme (Oberm.) Oberm.

Status: LR-lc

Endemism: Endemic

Distribution: Central

Ornithogalum unifolium Retz.

Status: LR-nt

HYDROPHYLLACEAE

Codon royenii L.

Status: LR-lc

Near-endemic

Codon schenckii Schinz

Status: LR-lc

Endemism: Near-endemic

IRIDACEAE

Ferraria glutinosa (Baker) Rendle

Status: LR-lc

Gladiolus dalenii Van Geel

Status: LR-lc

Gladiolus magnificus (Harms) Goldblatt

Status: LR-nt

Known from very few specimens. Magnificent plant.

Occurs in Kolohori sandveld, often with tall grass that is regularly overgrazed or burnt in northeast.

Gladiolus orchidiflorus Andrews

Status: LR-nt

Distribution: South-West

One of the most widespread South African winter-rainfall species. Difficult to see because of dull colour of the flowers, but these are wonderfully scented.

Gladiolus permeabilis D.Delaroche subsp. *edulis*

(Burch. ex Ker Gawl.) Oberm.

Status: LR-lc

Gladiolus saccatus (Klatt) Goldblatt & M.P.de Vos

Status: LR-lc

Moraea carsonii Baker

Status: LR-nt

Open grassland and rocky slopes—seasonally wet.

Poorly known, but is expected to be more widespread.

Moraea polystachya (Thunb.) Ker Gawl.

Status: LR-nt

Widespread in dry areas, variety of habitats. Can cover hectares in good years. Poisonous to cattle and sheep.

Moraea venenata Dinter

Status: LR-nt

Flot areas of alkaline to saline soils. Almost near-endemic. Toxic to stock. Needs study.

LAMIACEAE

Aeolanthus neglectus (Dinter) Launert

Status: LR-lc

Hemizygia floccosa Launert

Status: LR-nt

Endemism: Endemic

Distribution: North-West-Central

Has ethnobotanical use.

Hyptis spicigera Lam.

Status: LR-lc

Plectranthus dinteri Briq.

Status: LR-lc

Endemism: Endemic

Distribution: North-Central

Plectranthus hereroensis Engl.

Status: LR-lc

Stachys dinteri Launert

Status: LR-lc

Endemism: Endemic

Distribution: Central

LOBELIACEAE

Lobelia erinus L.

Status: LR-lc

LORANTHACEAE

Agelanthus discolor (Schinz) Balle

Status: LR-lc

Endemism: Endemic

Distribution: Central, North

Agelanthus pungu (De Wild.) Polhill & Wiens

Status: LR-lc

Distribution: Caprivi

Agelanthus terminaliae (Engl. & Gilg) Polhill & Wiens

Status: LR-lc

Distribution: North-East

Oncocalyx welwitschii (Engl.) Polhill & Wiens

Status: LR-lc

Endemism: Near-endemic

Distribution: Central

Phragmanthera dombeyae (K.Krause & Dinter)

Polhill & Wiens

Status: LR-lc

Endemism: Near-endemic

Distribution: Central

Usually montane or riverine forest, can be a pest.

Phragmanthera glaucocarpa (Peyr.) Balle

Status: LR-lc

Endemism: Near-endemic

Distribution: North-Central

Ploteau regions. Is a parasite on *Croton*, but also has other hosts, pest of citrus.

Phragmanthera guerichii (Engl.) Balle

Status: LR-lc

Endemism: Near-endemic

Distribution: North

Plicosepalus kalachariensis (Schinz) Danser

Status: LR-lc

Distribution: North

Plicosepalus undulatus (E.Mey. ex Harv.) Tiegh.

Status: LR-lc

Endemism: Near-endemic

Distribution: South-West to North

Septulina glauca (Thunb.) Tiegh.

Status: LR-lc

Distribution: South-West

Septulina ovalis (E.Mey. ex Harv.) Tiegh.

Status: LR-lc

Endemism: Near-endemic

Distribution: South-West

Tapinanthus oleifolius (J.C.Wendl.) Danser

Status: LR-lc

LYTHRACEAE

Nesaea schinzii Koehne

Status: LR-lc

Rotala dinteri Koehne

Status: LR-lc

Endemism: Near-endemic

MALVACEAE

Gossypium herbaceum L. subsp. *africanum*

(D.Watt) Vollesen

Status: LR-lc

Hibiscus articulatus Hochst. ex A.Rich.

Status: LR-lc

Distribution: Caprivi

Pavonia rehmannii Szyszyl.

Status: LR-lc

Endemism: Endemic

Distribution: wide

MELIACEAE

Turraea zambesica Sprague & Hutch.

Status: LR-lc

Distribution: Caprivi

MELIANTHACEAE

Meliantanthus pectinatus Harv. subsp. *gariepinus*

(Merxm. & Roessler) Tansley

Status: LR-lc

Endemism: Near-endemic

Distribution: South-Central, South-East

MENISPERMACEAE

Antizoma angustifolia (Burch.) Miess ex Harv.

Status: LR-lc

MESEMBRYANTHEMACEAE

Amphibolia rupis-arcatae (Dinter)

H.E.K.Hartmann

Status: LR-lc

Endemism: Endemic?

Threats: Mining, collection

Distribution: South-West

In soft, firm sand near the sea and on slopes, often in limestone.

Amphibolia saginata (L.Bolus) H.E.K.Hartmann

Status: LR-nt

Endemism: Endemic

Threats: Mining, collection

Distribution: South-West

Antimima dolomitica (Dinter) H.E.K.Hartmann

Status: LR-nt

Endemism: Endemic

Threats: Mining, collection

Distribution: South-West

Antimima perforata (L.Bolus) H.E.K.Hartmann

Status: LR-lc

Threats: Mining, collection

Aptenia geniculiflora (L.) Bittrich ex Gerbaulet

Status: LR-lc

Distribution: North-West-Central to South-East

Very widespread.

Aridaria brevicarpa L.Bolus

Status: LR-lc

Widespread and common.

Aridaria noctiflora (L.) Schwantes subsp. *noctiflora*

Status: LR-lc

Widespread and common.

Aridaria noctiflora (L.) Schwantes subsp. *straminea* (Haw.) Gerbaulet

Status: LR-lc

Endemism: Near-endemic

Widespread and common.

Aridaria serotina L.Bolus

Status: LR-lc

Widespread and common.

Brownanthus ciliatus (Aiton) Schwantes subsp. *schenckii* (Schinz) Ihlenf. & Bittrich

Status: LR-lc

Endemism: Endemic

Distribution: South-West, South-East

Cephalophyllum ebracteatum (Pax ex Schltr. & Diels) Dinter & Schwantes

Status: LR-lc

Endemism: Near-endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

One subpopulation of one mine is probably destroyed by now.

Eberlanzia clausa (Dinter) Schwantes

Status: LR-nt

Endemism: Endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

Eberlanzia sedoides (Dinter & A.Berger)

Schwantes

Status: LR-nt

Endemism: Near-endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

Mesembryanthemum pellitum Friedrich

Status: LR-nt

Endemism: Endemic

Threats: Mining

Distribution: South-West

Common, but known only from fewer than five localities.

Psammophora modesta (Dinter & A.Berger) Dinter & Schwantes

Status: LR-lc

Endemism: Near-endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

Many subpopulations.

Psilocaulon salicornioides (Pax) Schwantes

Status: LR-lc

Endemism: Endemic

Distribution: wide

Synaptophyllum juttiae (Dinter & A.Berger) N.E.Br.

Status: LR-lc

Endemism: Endemic

Threats: Habitat degradation, mining, collection

Distribution: South-West

MOLLUGINACEAE

Hypertelis bowkeriana Sond.

Status: LR-lc

Hypertelis salsoloides (Burch.) Adamson

Status: LR-lc

Hypertelis spergulacea E.Mey. ex Fenzl

Status: LR-lc

Near-endemic

Limeum aethiopicum Burm.f. var. *glabrum* Moq.

Status: LR-lc

Limeum arenicolum G.Schellenb.

Status: LR-lc

Limeum argute-carinatum Wawra & Peyr.

Status: LR-lc

Limeum dinteri G.Schellenb.

Status: LR-lc

Limeum fenestratum (Fenzl) Heimerl var.

fenestratum

Status: LR-lc

Limeum myosotis H.Walter

Status: LR-lc

Limeum pterocarpum (J.Gay) Heimerl

Status: LR-lc

Limeum sulcatum (Klotzsch) Hutch.

Status: LR-lc

Limeum viscosum (J.Gay) Fenzl subsp.

nummifolium (H.Walter) Friedrich

Status: LR-lc

Limeum viscosum (J.Gay) Fenzl subsp. *viscosum*

Status: LR-lc

Mollugo walteri Friedrich

Status: LR-lc

Endemism: Endemic

Distribution: South

Fairly widespread and possibly more common, if correctly identified and collected more often.

Pharnaceum brevicaule (DC.) Bartl.

Status: LR-lc

MORACEAE

Ficus fischeri Warb. ex Mildbr. & Burret

Status: LR-lc

Distribution: Caprivi

Ficus glumosa Delile

Status: LR-lc

Distribution: North-West

Ficus pygmaea Welw. ex Hiern

Status: LR-lc

Distribution: Caprivi

Has ethnobotanical use.

Ficus sycomorus L.

Status: LR-lc

Ficus thonningii Blume

Status: LR-lc

MORINGACEAE

Moringa ovalifolia Dinter & A.Berger

Status: LR-lc

Endemism: Near-endemic

NYCTAGINACEAE

Boerhavia deserticola Codd

Status: LR-lc

Endemism: Endemic

Distribution: North-West, North-West-Central

Boerhavia repens L.

Status: LR-lc

NYMPHAEACEAE

Nymphaea lotus L.

Status: LR-lc

OLACACEAE

Olax dissitiflora Oliv.

Status: LR-lc

Distribution: North-West

Ximenia americana L. var. *americana*

Status: LR-lc

Ximenia caffra Sond. var. *natalensis*

Status: LR-lc

Endemism: Near-endemic

OLEACEAE

Schrebera trichoclada Welw.

Status: LR-lc

Distribution: Caprivi

OPIIACEAE

Opilia campestris Engl. var. *campestris*

Status: LR-lc

ORCHIDACEAE

Eulophia speciosa (R.Br. ex Lindl.) Bolus

Status: LR-lc

Threats: Collection

Distribution: North-Central, East

Few to many plants may be seen in local colonies.

Flowers very attractive. Has ethnobotanical value.

Habenaria armatissima Rchb.f.

Status: LR-lc

Threats: Collection

Distribution: North-Central, North-East

PASSIFLORACEAE

Adenia repanda (Burch.) Engl.

Status: LR-lc

PEDALIACEAE

Harpagophytum procumbens (Burch.) DC. ex

Meisn. subsp. *procumbens*

Status: LR-cd

Rogeria bigibbosa Engl.

Status: LR-lc

Endemism: Endemic

Distribution: Central

Rogeria longiflora (Royaen) J.Gay ex DC.

Status: LR-lc

Sesamothamnus benguellensis Welw.

Status: LR-lc

Endemism: Near-endemic

Distribution: North-West

Sesamothamnus guerichii (Engl.) E.A.Bruce

Status: LR-lc

Endemism: Near-endemic

Sesamum abbreviatum Merxm.

Status: LR-lc
Endemism: Endemic
Distribution: Central

Sesamum angalense Welw.
Status: LR-lc

Sesamum capense Burm.f.
Status: LR-lc

Sesamum marlothii Engl.
Status: LR-lc
Endemism: Endemic
Distribution: Central

Sesamum rigidum Peyr. subsp. *merenskyanum*
Ihlenf. & Seidenst.
Status: LR-lc
Endemism: Near-endemic
Distribution: North

Sesamum schinzianum Asch.
Status: LR-lc
Endemism: Near-endemic

PLUMBAGINACEAE

Plumbago pearsanii L.Balus
Status: LR-lc
Endemism: Endemic
Distribution: Central to South

POACEAE

Eragrostis arenicala C.E.Hubb.
Status: LR-lc

Eragrostis patens Oliv.
Status: LR-lc

Eragrostis walteri Pilg.
Status: LR-lc
Endemism: Endemic
Distribution: South

Pennisetum faermeranum Leeke
Status: LR-lc
Endemism: Endemic
Distribution: North

Paganarthria leiathra Hack.
Status: LR-lc
Endemism: Endemic
Distribution: Central

Setaria homonyma (Steud.) Chiav.
Status: LR-lc

Stipagrostis damarensis (Mez) De Winter
Status: LR-lc
Endemism: Endemic
Distribution: North to Central

Stipagrostis garubensis (Pilg.) De Winter
Status: LR-lc
Endemism: Endemic
Distribution: South

Stipagrostis gonatostachys (Pilg.) De Winter
Status: LR-lc
Endemism: Endemic
Distribution: Central to South

Stipagrostis hermannii (Mez) De Winter
Status: LR-lc
Endemism: Endemic
Distribution: wide

Stipagrostis hochstetteriana (L.C.Beck ex Hack.)
De Winter var. *hochstetteriana*
Status: LR-lc

Endemism: Near-endemic
Distribution: wide

Stipagrostis namibensis De Winter
Status: LR-lc
Endemism: Endemic
Distribution: Central

Stipagrostis sabuticola (Pilg.) De Winter
Status: LR-lc
Endemism: Endemic
Distribution: Central to South

POLYGALACEAE

Polygala guerichiana Engl.
Status: LR-lc
Endemism: Endemic
Distribution: wide

PORTULACACEAE

Anacampseros albissima Marloth
Status: LR-lc

Ceraria fruticulosa H.Pearson & Stephens
Status: LR-lc
Endemism: Near-endemic

Ceraria langipedunculata Merxm. & Padlech
Status: LR-lc
Endemism: Endemic
Distribution: North-East

Ceraria namaquensis (Sond.) H.Pearson & Stephens
Status: LR-lc
Endemism: Near-endemic

Portulaca faliata Ker Gawl.
Status: LR-lc

Portulacaria armiana van Jaarsv.
Status: LR-lc
Endemism: Near-endemic

PTAEROXYLACEAE

Ptaeroxylon abliquum (Thunb.) Radlk.
Status: LR-lc

RUBIACEAE

Amphiasma divaricatum (Engl.) Bremek.
Status: LR-lc
Endemism: Endemic
Distribution: wide

Amphiasma merenskyanum Bremek.
Status: LR-lc
Endemism: Endemic
Distribution: North-West, North-Central, Central

Kahautia azurea (Dinter & K.Krause) Bremek.
Status: LR-lc
Endemism: Endemic
Distribution: North, wide

RUTACEAE

Citrapsis dawena Swingle
Status: LR-lc
Distribution: Caprivi
Armed shrub. Limited to riverine vegetation. Is utilised.

SANTALACEAE

Osyris lanceolata Hachst. & Steud.
Status: LR-lc

Thesium xeraphyiticum A.W.Hill
Status: LR-nt
Endemism: Endemic
Distribution: Central
Not collected since 1977.

SCROPHULARIACEAE

Antherothamnus pearsonii N.E.Br
Status: LR-lc

Anticharis ebracteata Schinz
Status: LR-lc
Endemism: Endemic
Distribution: West

Anticharis imbricata Schinz
Status: LR-lc
Endemism: Endemic
Distribution: South-West-Central

Anticharis inflata Marloth & Engl.
Status: LR-lc
Endemism: Endemic

Aptosimum arenarium Engl.
Status: LR-lc
Endemism: Endemic
Distribution: wide
Seems to be on slopes of mountains.

Aptosimum suberosum Weber
Status: LR-nt
Endemism: Endemic
Threats: Grazing/browsing
Distribution: North-Central
Perennial herb forms carpets. Limited distribution that could be affected by over-stocking of game.

Craterostigma plantagineum Hochst.
Status: LR-lc

Hiernia angalensis S.Maare
Status: LR-lc
Endemism: Near-endemic

Jamesbrittenia megadenia Hilliard
Status: LR-lc
Endemism: Near-endemic
Distribution: South-Central

Manulea dubia (Skan) Overkott ex Raessler
Status: LR-lc
Endemism: Endemic
Distribution: North-West-Central, Central, South-West, South-East

Manulea gariepina Benth.
Status: LR-lc
Distribution: South

Manulea namibensis (Roessler) Hilliard
Status: LR-lc
Endemism: Endemic
Threats: Mining
Distribution: South-West

Manuleopsis dinteri Thell.
Status: LR-lc
Endemism: Endemic
Distribution: Central

Nemesia fruticans (Thunb.) Benth.
Status: LR-lc

Phyllapodium hispidulum (Thell.) Hilliard
Status: LR-nt
 Endemism: Endemic?
 Distribution: South-West

SELAGINACEAE

Selago albomarginata Hilliard
Status: LR-ic
 Distribution: East

Selago alopecuroides Rolfe
Status: LR-ic
 Endemism: Near-endemic
 Distribution: Central

Selago amboensis Rolfe
Status: LR-nt
 Endemism: Endemic
 Distribution: Central

Selago dinteri Rolfe subsp. *dinteri*
Status: LR-ic
 Endemism: Near-endemic
 Distribution: Central

Selago divaricata L.f.
Status: LR-ic

Selago kurtzdinteri Hilliard
Status: LR-ic
 Endemism: Near-endemic
 Distribution: Central
LR-nt may be a better assessment, as it prefers oreos around ponds, which are often trompled. It is widespread.

SOLANACEAE

Lycium grandicalyx Joubert & Venter
Status: LR-ic
 Endemism: Endemic
 Distribution: South-West, South-East

Salanum dinteri Bitter
Status: LR-ic
 Endemism: Endemic
 Distribution: Central

Salanum rigescentoides Hutch.
Status: LR-ic
 Endemism: Endemic
 Distribution: wide

STERCULIACEAE

Dambeya rotundifolia (Hochst.) Planch. var. *rotundifolia*
Status: LR-ic

Hermannia amabilis Marloth ex K.Schum.
Status: LR-ic
 Endemism: Endemic
 Distribution: North-West, Central

Sterculia africana (Lour.) Fiori
Status: LR-ic

TECOPHILAEACEAE

Cyanella amboensis Schinz
Status: LR-nt
 Endemism: Endemic
 Distribution: North-West-Central

TILIACEAE

Corchorus merxmuelleri Wild
Status: LR-ic
 Endemism: Endemic
 Distribution: North-West-Central

Grewia falcistipula K.Schum.
Status: LR-ic
Fruits edible.

URTICACEAE

Farsskaolea candida L.f.
Status: LR-ic

Farsskaalea hereroensis Schinz
Status: LR-ic
 Endemism: Near-endemic

Farsskaalea viridis Ehrenb. ex Webb
Status: LR-ic

Obetia carruthersiana (Hiern) Rendle
Status: LR-ic
 Endemism: Near-endemic

VAHLIACEAE

Vahlia capensis (L.f.) Thunb. subsp. *capensis*
Status: LR-ic
 Endemism: Near-endemic

VERBENACEAE

Lantana dinteri Moldenke
Status: LR-ic
 Endemism: Near-endemic
 Distribution: North (wide)

VISCACEAE

Viscum capense L.f.
Status: LR-ic
 Distribution: South
Shrubland, usually coastal and riverine. Various hosts.

Viscum rotundifolium L.f.
Status: LR-ic
 Distribution: West, Central

Viscum schaeferi Engl. & K.Krause
Status: LR-ic
Dry woodland and mixed bushveld.

Viscum tuberculatum A.Rich.
Status: LR-ic

VITACEAE

Cyphostemma cirrhosum (Thunb.) Desc. ex Wild & R.B.Drumm. subsp. *transvaalense* (Szyszyl.) C.A.Sm.
Status: LR-nt
 Threats: Habitat degradation
 Distribution: North-East

Cyphostemma cangestum (Baker) Desc. ex Wild & R.B.Drumm.
Status: LR-ic
 Distribution: West, North-Central

Cyphostemma currarii (Hook.f.) Desc.
Status: LR-ic
 Endemism: Near-endemic
 Threats: Collection, habitat degradation
 Distribution: North-West, Central

Cyphostemma hereraense (Schinz) Desc. ex Wild & R.B.Drumm.
Status: LR-ic

Cyphostemma amburens (Gilg & M.Brandt) Desc.
Status: LR-ic
 Endemism: Endemic
 Distribution: North-West

Cyphostemma ruacanense (Exell & Mendonça) Desc.
Status: LR-nt
 Distribution: North-West
Hos ethnobotanical use.

Cyphostemma sandersonii (Harv.) Desc.
Status: LR-nt
 Threats: Habitat degradation
 Distribution: North-Central, East
Hos ethnobotanical use.

Cyphostemma uter (Exell & Mendonça) Desc.
Status: LR-nt
 Endemism: Near-endemic
 Threats: Habitat degradation, collection
 Distribution: North-West
No young plants were seen in field.

WELWITSCHIACEAE

Welwitschia mirabilis Hook.f.
Status: LR-ic
 Endemism: Near-endemic
 Distribution: North-West-Central, North-West

ZYGOPHYLLACEAE

Fagonia isatricha Murb. var. *spinescens* (Schwartz) Hadidi
Status: LR-ic
 Endemism: Near-endemic

Sisyndite spartea E.Mey. ex Sond.
Status: LR-ic
 Endemism: Near-endemic
 Distribution: South

Zygophyllum applanatum Van Zyl
Status: LR-nt
 Endemism: Endemic
 Threats: Grazing/browsing
Limited distribution in mainly winter rainfall area. Seedlings and young plants seen. Populations of hundreds of plants are seen where no grazing occurs.

Zygophyllum clavatum Schltr. & Diels
Status: LR-ic
 Endemism: Near-endemic
 Distribution: West

Zygophyllum cardinalium L.f.
Status: LR-ic
 Distribution: wide
Large subpopulations; wide distribution.

Zygophyllum cretaceum Van Zyl ined.
Status: LR-nt
 Endemism: Near-endemic
 Distribution: South-West
Limited distribution, scattered individuals.

Zygophyllum cylindricum Schinz
Status: LR-ic
 Endemism: Endemic
 Distribution: North-West, North-West-Central
Grazing damage is minimal.

Zygophyllum decumbens Delile var. *decumbens*
Status: LR-lc
 Endemism: Near-endemic
 Distribution: South
 Widespread, large populations with many individuals from young to old.

Zygophyllum hirticaule Van Zyl
Status: LR-nt
 Endemism: Endemic
 Threats: Grazing/browsing
 Large subpopulations with seedlings and juveniles seen.
 Needs further collecting.

Zygophyllum leptopetalum E.Mey.ex Sond.
Status: LR-nt
 Threats: Grazing/browsing
 Distribution: South
 Scattered individuals over large areas; palatable.

Zygophyllum leucocladum Schltr. & Diels
Status: LR-nt
 Endemism: Near-endemic
 Threats: Grazing/browsing
 Distribution: South

Zygophyllum longicapsulare Schinz
Status: LR-lc
 Endemism: Near-endemic
 Distribution: South-West
 Grazing damage negligible. Large populations and scattered individuals occur.

Zygophyllum longistipulatum Schinz
Status: LR-nt
 Endemism: Endemic

Distribution: South-Central
 Limited distribution, small populations, individuals scattered, young and seedlings are rare.

Zygophyllum microcarpum Cham.
Status: LR-lc
 Endemism: Near-endemic
 Distribution: South
 Probably not palatable, as grazing damage is rare.
 Occurs in large subpopulations that are widespread.

Zygophyllum morganiana L.
Status: LR-nt
 Threats: Grazing/browsing
 Distribution: South

Zygophyllum patenticaulum Van Zyl ined.
Status: LR-nt
 Endemism: Near-endemic
 Distribution: South-West
 Restricted distribution. Large subpopulations with hundreds of individuals.

Zygophyllum prismatocarpum E.Mey. ex Sond.
Status: LR-lc
 Endemism: Near-endemic
 Distribution: South-West, South-West-Central
 Seedlings and juveniles present.

Zygophyllum pubescens Schinz
Status: LR-lc
 Distribution: South

Young and seedlings are rare.

Zygophyllum retrofractum Thunb.
Status: LR-lc
 Endemism: Near-endemic
 Distribution: South

Zygophyllum rigidum Schinz
Status: LR-lc
 Endemism: Near-endemic
 Large subpopulations with many young plants and seedlings; many scattered individuals.

Zygophyllum simplex L.
Status: LR-lc
 Endemism: Near-endemic

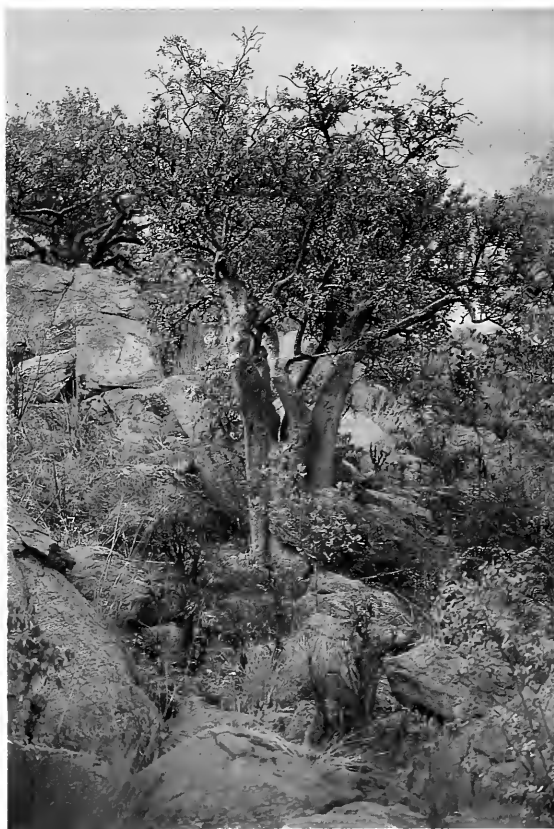
Zygophyllum spongiosum Van Zyl ined.
Status: LR-lc
 Endemism: Near-endemic

Zygophyllum stapffii Schinz
Status: LR-lc
 Endemism: Endemic
 Distribution: North-West to South-West-Central
 Small and large subpopulations; no grazing.

Zygophyllum tenue P.E.Glover
Status: LR-lc
 Endemism: Near-endemic
 Threats: Grazing/browsing
 Distribution: South
 Young individuals seen.



Ferraria schaefferi is listed as **Vulnerable**.
 (Photo: G. Owen-Smith)



Landscape view in Namibia, Ondjamu Hill.
 (Photo: E. Marais & A.H. Kirk-Spriggs)

ACANTHACEAE

Asystasia schimperii T.Anderson
Status: DD
Taxonomically uncertain.

Asystasia welwitschii S.Moore
Status: DD
Endemism: Near-endemic
Distribution: North-West
Not collected since the 1960s. Known from one specimen in Namibia, but widespread or well-known elsewhere.

Barleria megalosiphon Mildbr.
Status: DD
Distribution: Caprivi
Known from one specimen collected in 1959, but widespread or well-known elsewhere.

Barleria prionitis L. subsp. *ameliae* (A.Meeuse)
Brummitt & Wood
Status: DD
Taxonomically uncertain.

Blepharis macra (Nees) Vollesen
Status: DD
Endemism: Near-endemic
Distribution: South-West
Known from one specimen in Namibia, but widespread or well-known elsewhere.

Petalidium spiniferum C.B.Clarke
Status: DD
Endemism: Near-endemic
Distribution: North-West
Taxonomically uncertain.

Ruellia otaviensis P.G.Mey.
Status: DD

AIZOACEAE

Galenia fallax Pax
Status: DD
Endemism: Near-endemic
Distribution: South-West
Known from one collection in 1908 only. Taxonomically uncertain.

Plinthus rehmannii G.Schellenb.
Status: DD
Known from one collection in 1956.

Tetragonia rangeana Engl.
Status: DD
Endemism: Endemic
Distribution: South-West
Known from the type and two additional specimens.

ALLIACEAE

Tulbaghia tenuior K.Krause & Dinter
Status: DD

AMARANTHACEAE

Sericocoma avolans Fenzl
Status: DD
Taxonomically uncertain.

Sericocoma pungens Fenzl
Status: DD
Endemism: Near-endemic
Taxonomically uncertain.

AMARYLLIDACEAE

Brunsvigia radula (Jacq.) Aiton
Status: DD
Distribution: South-East

Crinum baumii Harms
Status: DD
Distribution: North-East
Taxonomically uncertain.

Crinum carolo-schmidtii Dinter
Status: DD
Endemism: Near-endemic
Taxonomically uncertain.

Crinum euchraphyllum I.Verd.
Status: DD
Taxonomically uncertain.

Crinum parvibulbosum Dinter ex Overkott
Status: DD
Taxonomically uncertain.

Crinum rautanenianum Schinz
Status: DD
Endemism: Endemic
Distribution: North-Central
Taxonomically uncertain.

Crinum subcernuum Baker
Status: DD
Taxonomically uncertain.

Crinum zeylanicum (L.) L.
Status: DD
Taxonomically uncertain.

Cybistetes longifolia (L.) Milne-Redh. & Schweick.
Status: DD
Known from one specimen in Namibia, but widespread or well-known elsewhere.

Cyrtanthus herrei (F.M.Leight.) R.A.Dyer
Status: DD
Endemism: Near-endemic

Haemanthus namaquensis R.A.Dyer
Status: DD
Endemism: Near-endemic
Distribution: South-West

Haemanthus pubescens L.f. subsp. *arenicola*
Snijman
Status: DD
Endemism: Near-endemic
Distribution: South-West

Nerine duparquetiana (Baill.) Baker
Status: DD

Nerine pusilla Dinter
Status: DD
Endemism: Endemic
Distribution: South-West-Central, South-West

Scadoxo multiflorus (Martyn) Raf. subsp. *katharinae* (Baker) Friis & Nordal
Status: DD
Distribution: North-West
Known from one collection only.

ANACARDIACEAE

Lannea schweinfurthii (Engl.) Engl. var. *tomentosa* (Dunkley) Kokwaro
Status: DD

Distribution: North-East
Known from one collection only.

Lannea schweinfurthii (Engl.) Engl. var. *stuhlmannii* (Engl.) Kokwaro
Status: DD
Known from the type or a very limited number of specimens only.

Ozoroa insignis Delile subsp. *latifolia* (Engl.) R.Fern.
Status: DD
Known from two collections only.

Ozoroa okavangensis R.R. & A.Fern.
Status: DD
Endemism: Endemic?
Distribution: North-East border

APIACEAE

Heteromorpha arborescens (Spreng.) Cham. & Schltdl. var. *frutescens* P.J.D.Winter
Status: DD
Has ethnobotanical use.

APOCYNACEAE

Adenium oleifolium Stapf
Status: DD
Distribution: South-East
Known from one specimen in Namibia, but widespread or well-known elsewhere. Not yet confirmed to occur in Namibia.

Brachystelma codonantherum Bruyns
Status: DD
Endemism: Endemic
Threats: Collection
Distribution: North-East
Known from one specimen only. Not yet confirmed to occur in Namibia.

Brachystelma recurvatum Bruyns
Status: DD
Endemism: Endemic
Threats: Collection
Distribution: Central
Known from one specimen only. Not yet confirmed to occur in Namibia.

Ceropegia floribunda N.E.Br.
Status: DD
Threats: Collection
Known from one specimen in Namibia, but widespread or well-known elsewhere.

Ceropegia occidentalis R.A.Dyer
Status: DD
Threats: Collection

Cynanchum gerrardii (Harvey) Liedtke
Status: DD
Threats: Collection
Distribution: Caprivi
Known from one specimen in Namibia, but widespread or well-known elsewhere.

Cynanchum schistoglossum Schltr.
Status: DD
Known from two collections only, but widespread or well-known elsewhere.

Duvalia caespitosa (Masson) Haw. var. *caespitosa*
Status: DD
Known from one specimen in Namibia, but widespread or well-known elsewhere.

Fockea multiflora K.Schum.

Status: DD
Threats: Collection
Distribution: North

Hoodia officinalis (N.E.Br.) Plowes subsp. *officinalis*

Status: DD
Threats: Collection
Not yet confirmed to occur in Namibia.

Huernia levyi Oberm.

Status: DD
Threats: Collection
Distribution: Caprivi
Known from only one collection in 1959 from o limited oreo.

Huernia namaquensis Pillans

Status: DD
Threats: Collection
Not yet confirmed to occur in Namibia.

Huernia thuretii Cels

Status: DD
Threats: Collection -
Recorded from one oreo that is very disjunct from other populations and has never been found ogoin.
Taxonomically uncertain.

Huernia urceolata L.C.Leach

Status: DD
Endemism: Near-endemic
Threats: Collection
Distribution: North-West
Known from two collections only. Taxonomically uncertain.

Huernia verekeri Stent. var. *verekeri*

Status: DD
Threats: Habitat degradation, urban expansion, collection
Distribution: North-West
Not yet confirmed to occur in Namibia.

Huernia zebrina N.E.Br. subsp. *magniflora*

(Phillips) L.C.Leach
Status: DD
Threats: Collection
Not yet confirmed to occur in Namibia.

Orbea albocastanea (Marloth) Bruyns

Status: DD
Endemism: Endemic
Threats: Collection
Distribution: South-East
Taxon under revision.

Orbea huillensis (Hiern) Bruyns subsp. *flava*

Bruyns
Status: DD
Threats: Collection
Taxon under revision.

Orbea lugardii (N.E.Br.) Bruyns

Status: DD
Threats: Collection
Taxon under revision.

Orbea lutea (N.E.Br.) Bruyns subsp. *vaga*

(N.E.Br.) Bruyns
Status: DD
Threats: Collection
Taxon under revision.

Orbea maculata (N.E.Br.) L.C.Leach subsp. *kaokoensis*

Bruyns
Status: DD
Threats: Collection
Taxon under revision.

Orbea maculata (N.E.Br.) L.C.Leach subsp. *rangana* (Dinter & A.Berger) Bruyns

Status: DD

Endemism: Endemic
Threats: Collection
Taxon under revision.

Orbea schweinfurthii (A.Berger) Bruyns

Status: DD
Threats: Collection
Taxon under revision.

Orbea valida (N.E.Br.) Bruyns subsp. *occidentalis*

Bruyns
Status: DD
Threats: Collection
Taxon under revision.

Pachycarpus lineolatus (Decne.) Bullock

Status: DD
Distribution: North-East
Known from one specimen in Namibia, but widespread or well-known elsewhere.

Piarranthus decipiens (N.E.Br.) Bruyns

Status: DD
Threats: Collection
Taxonomically uncertain. Not yet confirmed to occur in Namibia.

Stapelia hirsuta L.

Status: DD
Threats: Collection
Taxonomically uncertain. Not yet confirmed to occur in Namibia.

Stapelia schinzii A.Berger & Schltr. var. *angolensis*

Kers
Status: DD
Endemism: Near-endemic
Threats: Collection
Not yet confirmed to occur in Namibia.

Stapelia schinzii A.Berger & Schltr. var. *bergeriana*

(Dinter) L.C.Leach
Status: DD
Endemism: Endemic
Threats: Collection

Stapeliopsis urniflora Lavrans

Status: DD
Endemism: Endemic?
Threats: Collection
Distribution: South-Central
Taxon under revision.

Strophanthus kombe Oliv.

Status: DD
Known from one specimen in Namibia, but widespread or well-known elsewhere.

Tromotriche aperta (Masson) Bruyns

Status: DD
Endemism: Near-endemic
Threats: Collection, mining
Distribution: South-West
Known from one locality only.

ASPHODELACEAE

Aloe melanacantha A.Berger

Status: DD
Threats: Mining, collection
Distribution: South-West
Rare in Namibia, could be confused with *Aloe erinacea*.
Taxonomically uncertain. Known from one specimen in Namibia, but widespread or well-known elsewhere.

Bulbine tetraphylla Dinter

Status: DD
Endemism: Endemic
Threats: Mining, collection
Distribution: South

Trachyandra glandulosa (Dinter) Oberm.

Status: DD
Endemism: Endemic
Distribution: South-West
Known from type collected in 1931 and one disjunct specimen.

Trachyandra lanata (Dinter) Oberm.

Status: DD
Endemism: Endemic
Distribution: South-West

ASTERACEAE

Chrysocoma microphylla Thunb.

Status: DD
Known from one specimen in Namibia, but widespread or well-known elsewhere.

Dicoma capensis Less.

Status: DD
Taxon under revision.

Dicoma cuneneensis Wild

Status: DD
Endemism: Endemic?
Distribution: North-West
Taxon under revision.

Dicoma dinteri S.Moore

Status: DD
Endemism: Endemic
Distribution: Central
Taxon under revision.

Dicoma sessiliflora Harv. subsp. *sessiliflora* var.

membranacea (S.Moore) S.Ortiz & Rodr.Oubina
Status: DD
Taxon under revision.

Distephanus angolensis (O.Hoffman) H.Rob. &

B.Kahn
Status: DD
Distribution: North-West

Distephanus divaricatus (Steetz) H.Rob. & B.Kahn

Status: DD
Taxonomically uncertain.

Hirpicium gorterioides (Oliv. & Hiern) Roessler

subsp. *schinzii* (O.Hoffm) Roessler
Status: DD
Endemism: Near-endemic
Distribution: North-East
Taxonomically uncertain.

Nicolasia heterophylla S.Moore subsp. *affinis*

(S.Moore) Merxm.
Status: DD
Endemism: Endemic
Distribution: Central
Taxonomically uncertain.

Nicolasia heterophylla S.Moore subsp.

heterophylla
Status: DD
Endemism: Endemic
Distribution: Central

Nicolasia nitens (O.Hoffm.) Eyles

Status: DD
Known from o few disjunct collections only.

Nicolasia pedunculata S.Moore

Status: DD

Nicolasia stenoptera (O.Hoffm.) Merxm. subsp.

makarikariensis (Bremer & Oberm.) Merxm.
Status: DD
Taxonomically uncertain.

Nicolasia stenoptera (O.Hoffm.) Merxm. subsp. *stenoptera*
Status: DD
Toxonomically uncertain.

Nidorella resedifolia DC. subsp. *frutescens* Merxm.
Status: DD
 Distribution: North

Nolletia tenuifolia Mattf.
Status: DD
 Endemism: Endemic
 Distribution: Central
Toxonomically uncertain.

Osteospermum armatum Norl
Status: DD
 Endemism: Near-endemic
 Distribution: South
Only known from two specimens collected in the 1960s and 1970s.

Pentatrachia rehmsii (Merxm.) Merxm.
Status: DD
 Endemism: Endemic
 Distribution: Central
Known from type only. Toxonomically uncertain.

Pteronia rangei Muschl.
Status: DD
 Endemism: Endemic
 Distribution: South-West
Not yet confirmed to occur in Namibia.

Sphaeranthus epigaeus Schinz
Status: DD
 Endemism: Endemic
 Distribution: North-Central
Occurs in dense stands of grass and may have declined due to overgrazing. Toxonomically uncertain.

Sphaeranthus wattii Giess ex Merxm.
Status: DD
 Endemism: Endemic
 Distribution: North-Central
Known from type specimen only, collected in 1958. Toxonomically uncertain.

Vernonia glabra (Steetz) Vatke var. *ondongensis* (Klatt) Merxm.
Status: DD
 Endemism: Endemic?
Toxonomically uncertain.

BORAGINACEAE

Cordia pilosissima Baker
Status: DD
 Distribution: Caprivi
Toxon under revision.

BRASSICACEAE

Heliophila coronopifolia L.
Status: DD
 Distribution: South-West
Presence in Namibia needs confirmation.

Sisymbrium burchellii DC. var. *dinteri* (O.E.Schulz) Marais
Status: DD
 Endemism: Near-endemic
 Distribution: Central
Known from one collection in 1940s. Toxonomically uncertain.

Sisymbrium dissitiflorum O.E.Schulz
Status: DD
 Endemism: Near-endemic
Known from one specimen in Namibia, but widespread or well-known elsewhere. Not yet confirmed to occur in Namibia.

BURSERACEAE

Commiphora mossambicensis (Oliv.) Engl.
Status: DD
 Distribution: Caprivi
Known from one specimen collected in 1959. Widespread or well-known elsewhere.

Commiphora viminea Burtt Davy
Status: DD
Toxonomically uncertain.

CAMPANULACEAE

Wahlenbergia densicaulis Brehmer
Status: DD
 Endemism: Endemic?
 Distribution: Central
Not collected since 1963, but may be overlooked in the years it is present. Toxonomically uncertain.

Wahlenbergia subumbellata Markgr.
Status: DD
 Endemism: Endemic
 Distribution: South-West
Not yet confirmed to occur in Namibia.

CHENOPODIACEAE

Chenopodium amboanum (Murr) Aellen
Status: DD
 Endemism: Endemic
 Distribution: wide

Exomis microphylla (Thunb.) Aellen var. *microphylla*
Status: DD
Toxonomically uncertain. Not yet confirmed to occur in Namibia.

Suaeda merxmuelleri Aellen
Status: DD
 Endemism: Endemic?
Only four collections prior to the 1960s. Confused with S. fruticosa.

COMBRETACEAE

Combretum collinum Fresen. subsp. *suluense* (Engl. & Diels) Okafor
Status: DD
Seems to be along northern rivers from west to east.

Combretum oxystachyum Welw. ex M.A.Lawson
Status: DD
 Distribution: North-West

Combretum schumannii Engl.
Status: DD
Hos ethnobotanical use.

CRASSULACEAE

Adromischus schuldianus (Poelln.) Poelln. subsp. *juttae* (Poelln.) Toelken
Status: DD
 Endemism: Endemic
 Threats: Collection
 Distribution: disjunct

Adromischus schuldianus (Poelln.) Poelln. subsp. *schuldianus*
Status: DD
 Endemism: Endemic
 Threats: Collection
Toxonomically uncertain.

Crassula ausensis Hutchison subsp. *titanopsis* Pavelka
Status: DD
 Endemism: Endemic
 Threats: Collection
 Distribution: South-East
Known from one locality only. Toxonomically uncertain.

Crassula columnaris Thunb. subsp. *protifera* Friedrich
Status: DD
 Distribution: South-West
Toxonomically uncertain. Not yet confirmed to occur in Namibia.

Crassula corallina Thunb. subsp. *macrorrhiza* Toelken
Status: DD
 Endemism: Near-endemic
Not yet confirmed to occur in Namibia.

Crassula deceptor Schonland & Baker f.
Status: DD
 Endemism: Near-endemic
 Threats: Collection
 Distribution: South-West
Grows solitary or in colonies, usually on white quartzite; good camouflage. Uprooted by goat hooves. Needs collecting. Toxonomically uncertain.

Crassula deltoidea Thunb.
Status: DD
Toxonomically uncertain.

Crassula dependens Bolus
Status: DD
 Distribution: Central
Known from one specimen in Namibia, but widespread or well-known elsewhere.

Crassula exilis Harv. subsp. *sedifolia* (N.E.Br.) Toelken
Status: DD
 Endemism: Near-endemic
 Threats: Collection
Tiny cushion plants in rock crevices. Known from one specimen in Namibia, but widespread or well-known elsewhere.

Crassula grisea Schonland
Status: DD
 Endemism: Near-endemic
 Threats: Collection
 Distribution: South-West
Known from type or very limited number of specimens only.

Crassula mesembrianthemopsis Dinter
Status: DD
 Endemism: Near-endemic
 Threats: Collection
 Distribution: South-West-Central, South-West, South-East
Collector's item from winter rainfall region. Toxonomically uncertain.

Crassula namaquensis Schonland & Baker f. subsp. *lutea* (Schonland) Toelken
Status: DD

Crassula pallens Schonland & Baker f.
Status: DD
 Endemism: Near-endemic
 Distribution: South-West
Known from type or very limited number of specimens only.

Crassula rudolfii Schonland & Baker f.
Status: DD

Kalanchoe laciniata (L.) DC.
Status: DD
 Distribution: North-West

Known from only one specimen in Namibia, but widespread or well-known elsewhere. Since the specimen was collected in 1957, the oreo has been transformed.

***Tylecodon bleckiae* G.Will.**

Status: DD
Endemism: Near-endemic
Threats: Mining, collection
Distribution: South-West
In rock crevices on southwest-facing slopes in shade; confused with *T. buchholzianus*.

***Tylecodon pearsonii* (Schonland) Toelken**

Status: DD
Endemism: Near-endemic
Not yet confirmed to occur in Namibia.

***Tylecodon reticulatus* (L.f.) Toelken subsp. reticulatus**

Status: DD
Known from limited oreo only.

***Tylecodon similis* (Toelken) Toelken**

Status: DD
Endemism: Near-endemic
Distribution: South-West
Known from literature, but no specimen. Not yet confirmed to occur in Namibia.

CUCURBITACEAE

***Cucumis humifructus* Stent**

Status: DD

DIOSCOREACEAE

***Dioscorea asteriscus* Burkill**

Status: DD
Threats: Collection
Tuber is eaten, may be undercollected. Known from one specimen in Namibia, but widespread or well-known elsewhere.

***Dioscorea cochleari-apiculatus* De Wild.**

Status: DD
Threats: Collection
Distribution: Caprivi
Known from one specimen in Namibia (1969), but widespread or well-known elsewhere.

***Dioscorea dregeana* (Kunth) Dur. & Schinz**

Status: DD
Threats: Collection
Distribution: Caprivi
Known from one specimen in Namibia (1959), but widespread or well-known elsewhere.

***Dioscorea elephantipes* (L'Hér.) Engl.**

Status: DD
Threats: Collection
Known from three collections in Namibia only, but widespread or well-known elsewhere.

***Dioscorea hemicypta* Burkill**

Status: DD
Threats: Collection
Distribution: South-Central
Known from one specimen in Namibia (1988), but widespread or well-known elsewhere.

***Dioscorea hirtiflora* Benth.**

Status: DD
Threats: Collection
Distribution: North-East, Caprivi
Only known from two specimens collected in 1956 and 1959. Widespread or well-known elsewhere.

***Dioscorea quartiniana* A.Rich.**

Status: DD
Threats: Collection
Distribution: North-East

Four specimens collected in the 1950s. Widespread or well-known elsewhere.

EBENACEAE

***Diospyros batocana* Hiern**

Status: DD
Distribution: Caprivi
Known from type or very limited number of specimens only.

ERIOSPERMACEAE

***Eriospermum graniticolum* Dinter ex Poelln.**

Status: DD
Endemism: Endemic
Distribution: South-West

***Eriospermum namaquanum* Marloth ex P.L.Perry**

Status: DD
Endemism: Near-endemic

***Eriospermum parvifolium* Jacq.**

Status: DD
Endemism: Near-endemic

***Eriospermum volkmanniae* Dinter**

Status: DD
Endemism: Endemic
Distribution: Central
Dolomite rocks, altitude 1,700 m. Probably more widespread.

ERYTHROXYLACEAE

***Erythroxylum zambesiicum* N.Robson**

Status: DD
Distribution: Caprivi

EUPHORBIACEAE

***Bridelia mollis* Hutch.**

Status: DD
Known from one collection only. Not yet confirmed to occur in Namibia.

***Bridelia tenuifolia* Mull.Arg.**

Status: DD
Distribution: North-West
Known from two collections only.

***Croton pseudopulchellus* Pax**

Status: DD
Distribution: North-East
Known from one collection only.

***Euphorbia baliola* N.E.Br.**

Status: DD
Endemism: Endemic
Threats: Collection
Distribution: South-East
Known from type only, collected in 1912.

***Euphorbia benthamii* Hiern**

Status: DD
Known from one specimen in Namibia, but widespread or well-known elsewhere.

***Euphorbia brachiata* E.Mey. ex Boiss.**

Status: DD
Threats: Collection
Known from one specimen in Namibia, but widespread or well-known elsewhere.

***Euphorbia burmannii* E.Mey. ex Boiss.**

Status: DD
Threats: Collection
Distribution: South-West

Known only from the literature; no specimen. Taxonomically uncertain.

***Euphorbia congestiflora* L.C.Leach**

Status: DD
Endemism: Near-endemic
Distribution: North-West
Known from one specimen in Namibia, but widespread or well-known elsewhere.

***Euphorbia ephedroides* E.Mey ex Boiss. var. debilis**

L.C.Leach
Status: DD
Endemism: Endemic
Threats: Collection
Distribution: South-West

***Euphorbia espinosa* Pax**

Status: DD
Threats: Collection
Taxonomically uncertain.

***Euphorbia fusca* Marloth**

Status: DD
Threats: Collection
Only known collection from about 1932. Taxonomically uncertain.

***Euphorbia hottentota* Marloth**

Status: DD
Endemism: Near-endemic
Threats: Collection
Not collected for 70 years, but could be due to confusion with *E. virosa* and because it is difficult to press. Taxonomically uncertain. Known from one specimen in Namibia, but widespread or well-known elsewhere.

***Euphorbia ingens* E.Mey. ex Boiss.**

Status: DD
Threats: Habitat degradation
Known from very few collections.

***Euphorbia karroensis* (Boiss) N.E.Br.**

Status: DD
Known from one specimen in Namibia, but widespread or well-known elsewhere.

***Euphorbia matabelensis* Pax**

Status: DD
Threats: Collection
Taxonomically uncertain.

***Euphorbia pseudoduseimata* A.C.White, R.A.Dyer & B.Sloane**

Status: DD
Endemism: Endemic
Threats: Collection
Known from type or very limited number of specimens only.

***Euphorbia siliciicola* Dinter**

Status: DD
Endemism: Endemic
Taxonomically uncertain.

***Euphorbia spartaria* N.E.Br.**

Status: DD
Endemism: Endemic
Distribution: Central
Not yet confirmed to occur in Namibia.

***Euphorbia stapelioides* Boiss.**

Status: DD
Endemism: Near-endemic
Threats: Mining, collection
Distribution: South-West
Known from one specimen in Namibia, but widespread or well-known elsewhere.

***Euphorbia venenata* Marloth**

Status: DD
Endemism: Endemic
Threats: Collection

Distribution: North-Central
Taxonomically uncertain.

***Euphorbia volkmanniae* Dinter**

Status: DD

Endemism: Endemic

Known from two collections in 1925 and 1928 only.

Taxonomically uncertain.

***Excoecaria bussei* (Pax) Pax**

Status: DD

Distribution: Caprivi

Known from two collections only in 1969 and 1975.

***Jatropha decumbens* Pax & K.Hoffm.**

Status: DD

Endemism: Endemic

Distribution: North-East

FABACEAE

***Acacia hebeclada* DC. subsp. *chobiensis* (O.B.Mill.)**

A.Schreib.

Status: DD

Distribution: North-East

Known from one specimen in Namibia, but widespread or well-known elsewhere.

***Bolusia amboensis* (Schinz) Harms**

Status: DD

Endemism: Endemic

Distribution: North-Central, North-East

***Crotalaria aurea* Dinter ex Baker f.**

Status: DD

Endemism: Endemic

Distribution: Central

Annual on mountain slopes, not collected since 1974—
o very good rain year.

***Crotalaria kurtii* Schinz**

Status: DD

Endemism: Endemic

Distribution: Central

Taxonomically uncertain.

***Dalbergia martinii* F.White**

Status: DD

Known from one collection in 1959 only.

***Dalbergia nitidula* Welw. ex Baker**

Status: DD

Distribution: North

Not yet confirmed to occur in Namibia.

Elephantorrhiza goetzei* (Harms) Harms subsp. *goetzei

Status: DD

Distribution: North-East

***Elephantorrhiza schinziana* Dinter**

Status: DD

Endemism: Endemic

Distribution: North-Central

Probably confused with *E. suffruticosa* and may be more widespread. Occurs on upper mountain slopes. Known from type or very limited number of specimens only.

***Indigofera giessii* A.Schreib.**

Status: DD

Endemism: Endemic

Distribution: North-Central to East

Leaves and seeds used for dye.

***Lebeckia obovata* Schinz**

Status: DD

Endemism: Endemic

Distribution: Central

Fairly widespread in central parts, but may be misidentified. Taxonomically uncertain.

***Lessertia cryptantha* Dinter**

Status: DD

Endemism: Endemic

Distribution: South-West

Known from type only; collected in 1922.

***Lotononis linearifolia* B.-E.van Wyk**

Status: DD

Probably overlooked, few disjunct localities known.

***Lotononis maculata* Dummer**

Status: DD

Distribution: South

Poorly known species. Taxonomically uncertain.

***Lotononis pallidirosea* Dinter & Harms**

Status: DD

Endemism: Endemic

Distribution: Central

Taxonomically uncertain.

***Pericopsis angolensis* (Baker) Van Meeuwen**

Status: DD

***Tephrosia griseola* H.M.L.Forbes**

Status: DD

Endemism: Endemic

Distribution: North-West-Central

Taxonomically uncertain.

***Tephrosia pallida* H.M.L.Forbes**

Status: DD

Endemism: Endemic

Distribution: North-West-Central

Known from type specimen only.

HYACINTHACEAE

***Albuca karasbergensis* P.E.Glover**

Status: DD

Endemism: Endemic

Distribution: South-West-Central, Central

Known from two very disjunct specimens only. Taxon under revision.

***Albuca reflexa* Dinter & K.Krause**

Status: DD

Endemism: Endemic

Distribution: North-East

Taxon under revision.

***Lachenalia pearsonii* (P.E.Glover) W.F.Barker**

Status: DD

Endemism: Endemic

Distribution: South-West

Known from type or very limited number of specimens only.

***Ledebouria scabrida* Jessop**

Status: DD

Endemism: Endemic

Found in two disjunct areas at different times. Probably undercollected.

***Massonia echinata* L.f.**

Status: DD

Endemism: Near-endemic

Distribution: South-West

Known from one collection only.

***Neopaterosia falcata* G.J.Lewis**

Status: DD

Endemism: Near-endemic

Known from type and one collection in 1992.

***Ornithogalum apertum* (I.Verd.) Oberm.**

Status: DD

Known from one collection only.

Ornithogalum hispidum* Hornem. subsp. *hispidum

Status: DD

Distribution: South-West

***Ornithogalum prasinum* Lindl.**

Status: DD

Distribution: East-Central

Known from very few specimens.

***Ornithogalum setifolium* Kunth**

Status: DD

***Ornithogalum subcoriaceum* L.Bolus**

Status: DD

Distribution: South-West

Known from one collection only.

***Ornithogalum tenuifolium* F.Delaroche**

Status: DD

***Whiteheadia bifolia* (Jacq.) Baker**

Status: DD

Endemism: Near-endemic

HYPOXIDACEAE

***Hypoxis dinteri* Nel**

Status: DD

Endemism: Endemic?

Distribution: North-East, Caprivi

Taxon under revision.

IRIDACEAE

***Babiana namaquensis* Baker**

Status: DD

Endemism: Near-endemic

***Moraea pallida* (L.Bolus) Goldblatt**

Status: DD

***Moraea rigidifolia* Goldblatt**

Status: DD

Endemism: Endemic

Distribution: South-West

Known from one site only.

LAMIACEAE

***Aeollanthus namibensis* Ryding**

Status: DD

Endemism: Endemic

Distribution: North-West, North-West-Central

Probably undercollected; only three localities known.

LORANTHACEAE

***Tapinanthus mollissimus* (Engl.) Danser**

Status: DD

Endemism: Near-endemic

Distribution: North-Central

Occurs on various hosts. Not yet confirmed to occur in Namibia.

MELIACEAE

***Entandrophragma caudatum* (Sprague) Sprague**

Status: DD

Distribution: Caprivi

Only three collections.

***Entandrophragma spicatum* (C.DC.) Sprague**

Status: DD

Endemism: Near-endemic

Distribution: North

Has ethnobotanical use. Known from one specimen in Namibia, but widespread or well-known elsewhere.

MESEMBRYANTHEACEAE

Conophytum marginatum Lavis var. *littewoodii* (L.Bolus) Rawe
Status: DD4
 Threats: Collection
 Distribution: South-East
Only found once in the wild to the north end of Goodhouse Poort; exists in cultivation.

Conophytum ricardianum Loesch & Tischer subsp. *rubiflorum* Tischer
Status: DD
 Endemism: Endemic
 Threats: Habitat degradation, mining, collection
 Distribution: South-West

Conophytum wettsteinii (A.Berger) N.E.Br. subsp. *ruschii* (Schwantes) S.A.Hammer
Status: DD
 Threats: Collection

Dracophilus dealbatus (N.E.Br.) Walgate
Status: DD3 4
 Endemism: Near-endemic
 Threats: Habitat degradation, mining, agriculture, collection
 Distribution: South-West

Dracophilus delaetianus (Dinter) Dinter & Schwantes
Status: DD
 Endemism: Endemic
 Threats: Collection
 Distribution: South-West
Toxonomically uncertain.

Drosanthemum nordenstamii L.Bolus
Status: DD
 Endemism: Endemic
Toxonomically uncertain.

Eberlanzia cyathiformis (L.Bolus) H.E.K.Hartmann
Status: DD
 Threats: Mining, collection
 Distribution: South-West

Eberlanzia ebracteata (L.Bolus) H.E.K.Hartmann
Status: DD
 Threats: Mining, collection
 Distribution: South-West
Known from type or very limited number of specimens only.

Juttadinteria albata L.Bolus
Status: DD1 4
 Endemism: Near-endemic
 Threats: Habitat degradation, mining
 Distribution: South-West

Juttadinteria attenuata Walgate
Status: DD3
 Endemism: Endemic
 Distribution: South

Juttadinteria ausensis (L.Bolus) Schwantes
Status: DD2
 Endemism: Endemic
 Threats: Habitat degradation, mining, collection
 Distribution: South-West
Only recorded once.

Juttadinteria elizae (Dinter & A.Berger) L.Bolus
Status: DD3
 Endemism: Near-endemic

Malephora crocea (Jacq.) Schwantes var. *purpureo-crocea* (Haw.) H.Jacobsen & Schwantes
Status: DD
 Endemism: Near-endemic
Restricted distribution.

Namibia pomonae (Dinter) Dinter & Schwantes
Status: DD3
 Endemism: Endemic
 Threats: Habitat degradation, mining, collection
 Distribution: South-West
Known from one locality only.

Namibia ponderosa (Dinter & Schwantes) Dinter & Schwantes
Status: DD3
 Endemism: Endemic

Psammophora longifolia L.Bolus
Status: DD3
 Endemism: Endemic
 Threats: Habitat degradation, mining, collection
 Distribution: South-West
Restricted distribution with five subpopulations, but may be undercollected.

Ruschia namusmontana Friedrich
Status: DD
 Endemism: Endemic
Toxonomically uncertain.

Ruschianthus falcatus L.Bolus
Status: DD
 Endemism: Endemic

Stoeberia carpii Friedrich
Status: DD
 Endemism: Near-endemic

MOLLUGINACEAE

Corbichonia rubrivioleacea (Friedrich) Jeffrey
Status: DD
 Endemism: Endemic
 Distribution: South-West-Central, South-East

MORACEAE

Ficus ingens (Miq.) Miq.
Status: DD
 Distribution: North-West

Ficus verruculosa Warb.
Status: DD
Toxonomically uncertain.

NYCTAGINACEAE

Commicarpus decipiens Meikle
Status: DD
 Endemism: Endemic
 Distribution: wide

ORCHIDACEAE

Eulophia fridericii (Rchb.f.) A.V.Hall
Status: DD
 Threats: Collection
 Distribution: North-East
Very rare; little is known about its distribution. Attractive flowers. Last collected in 1956. Known from one specimen in Namibia, but widespread or well-known elsewhere.

Eulophia schweinfurthii Kraenzl.
Status: DD
 Threats: Collection
 Distribution: North-East, Caprivi
Attractive flower. Not collected after 1966. Known from one specimen in Namibia, but widespread or well-known elsewhere.

Habenaria rautaneniana Kraenzl.
Status: DD
 Threats: Collection

Distribution: North-Central
Known from type or very limited number of specimens only.

Habenaria subarmata Rchb.f.
Status: DD
 Threats: Collection
 Distribution: North-Central, North-East
Flowers are pretty but small. Not collected since 1976. Known from one specimen in Namibia, but widespread or well-known elsewhere.

Holothrix villosa Lindl.
Status: DD
Known from one specimen in Namibia, but widespread or well-known elsewhere.

OXALIDACEAE

Oxalis extensa Salter
Status: DD
 Endemism: Near-endemic
 Distribution: South-West
Toxonomically uncertain.

Oxalis laxicaulis R.Knuth
Status: DD
 Endemism: Near-endemic
 Distribution: South-West
Toxonomically uncertain.

Oxalis pseudo-cernua R.Knuth
Status: DD
 Endemism: Endemic
 Distribution: South-West

POACEAE

Dregeochloa pumila (Nees) Conert
Status: DD
 Endemism: Near-endemic

Eragrostis habrantha Rendle
Status: DD
Known from one collection in 1913. Widespread or well-known elsewhere.

Eragrostis sclerantha Nees subsp. *villosipes* (Jedwabn.) Launert
Status: DD
Known from one specimen in Namibia, but widespread or well-known elsewhere.

Leptochloa uniflora A.Rich.
Status: DD
 Distribution: Caprivi
Known from three collections 30 to 40 years ago. Widespread or well-known elsewhere.

Tetrapogon tenellus (Roxb.) Chiov.
Status: DD
 Distribution: North-Central
Known from four collections in one oreo only. Widespread or well-known elsewhere.

POLYGALACEAE

Polygala lasiosepala Levyns
Status: DD

PROTEACEAE

Protea gagei J.F.Gmel.
Status: DD
 Threats: Harvesting
 Distribution: North-East

RUBIACEAE

Canthium glaucum Hiern subsp. *frangula* (S.Moore) Bridson var. *frangula*
Status: DD
Distribution: Caprivi
Known from three disjunct collections only.

Feretia aeruginescens Stapf
Status: DD
Distribution: North-East
Known from type or very limited number of specimens only.

Gardenia resiniflua Hiern subsp. *resiniflua*
Status: DD
Distribution: Caprivi

Gardenia ternifolia Schumach. & Thonn. subsp. *jovis-tonantis* (Welw.) Verdc. var. *jovis-tonantis*
Status: DD
Distribution: Caprivi
Not collected since 1945.

Kohautia amboensis (Schinz) Bremek.
Status: DD
Endemism: Endemic
Distribution: North-East
Taxonomically uncertain.

SANTALACEAE

Thesium megalocarpum A.W.Hill
Status: DD
Endemism: Near-endemic
Taxonomically uncertain.

SAPINDACEAE

Erythrophysa alata (Eckl. & Zeyh.) Hutch.
Status: DD
Distribution: South-West-Central
Only three specimens.

SCROPHULARIACEAE

Alectra pseudobarleriae (Dinter) Dinter
Status: DD
Endemism: Endemic

Apotosimum albomarginatum Marloth & Engl.
Status: DD
Taxonomically uncertain.

Apotosimum angustifolium Weber & Schinz
Status: DD
Endemism: Near-endemic
Taxonomically uncertain.

Apotosimum glandulosum Weber & Schinz
Status: DD
Endemism: Near-endemic
Distribution: wide
Taxonomically uncertain.

Manulea tenella Hilliard
Status: DD
Endemism: Endemic
Distribution: East-Central
Poorly known, with meagre collections. Taxonomically uncertain.

SELAGINACEAE

Selago angolensis Rolfe
Status: DD
Distribution: North-East
Known from one specimen only. Taxonomically uncertain.

Selago angustibractea Hilliard
Status: DD
Endemism: Near-endemic
Distribution: South-West
Misidentified in the post. May hybridise with *S. lepida*.

Selago centralis Hilliard
Status: DD
Known from one collection in 1913 only.

Selago dinteri Rolfe subsp. *pseudodinteri* Hilliard
Status: DD
Endemism: Near-endemic
Distribution: wide
Widespread in Namibia with disjunct distribution.

Selago welwitschii Rolfe var. *australis* Hilliard
Status: DD

SELAGINELLACEAE

Selaginella imbricata (Forssk.) Spring ex Decne.
Status: DD
Threats: Damming
Distribution: North-West
Known from five specimens from one oreo only.

SOLANACEAE

Solanum damarense Bitter
Status: DD
Endemism: Endemic
Distribution: North-West
Taxonomically uncertain.

TILIACEAE

Grewia inaequilatera Garcke
Status: DD
Distribution: Caprivi

Grewia monticola Sond.
Status: DD
Distribution: Caprivi
Known from type or very limited number of specimens only.

Grewia pachycalyx K.Schum.
Status: DD
Distribution: Caprivi

Grewia subspathulata N.E.Br.
Status: DD

VISCACEAE

Viscum dielsianum Dinter ex Neusser
Status: DD
Endemism: Near-endemic
Distribution: South-Central

Viscum menyharthii Engl. & Schinz
Status: DD
Distribution: North-West-Central
Woodland and riverine.

VITACEAE

Cyphostemma bororens (Klotzsch) Desc. ex Wild & R.B.Drumm.
Status: DD
Threats: agriculture
Distribution: Caprivi
Known from one specimen in Namibia, but widespread or well-known elsewhere.

Cyphostemma puberulum (C.A.Sm.) Wild & R.B.Drumm.
Status: DD
Known from one specimen in Namibia, but widespread or well-known elsewhere.

ZYGOPHYLLACEAE

Zygophyllum chrysopteron Retief
Status: DD
Endemism: Near-endemic
Distribution: South
Palatable. Known from one specimen only, but widespread or well-known elsewhere.



A magnificently sized specimen of the widespread *Pterocarpus angolensis* (Photo: B. Curtis)



Eremothamnus marlothianus is threatened owing to mining. (Photo: G. Williamson)

South Africa



Janine E. Victor*

Introduction

To date, 3,268 species have been recorded as "threatened with extinction" in South Africa (Hilton-Taylor 1996a). This new Red Data List (RDL) is an attempt to provide updated assessments according to the 1994 IUCN system as a starting point from which progress can be made. It is important to realise that the list presented here is preliminary and can therefore only be used in conjunction with Hilton-Taylor (1996a, b, 1997) and should not be seen as a replacement. Only 949 (about 25%) of the taxa listed by Hilton-Taylor (1996a, b, 1997) have so far been updated. Where possible, whole families were completed, but in four cases (Aizoaceae, Apocynaceae, Aloaceae, and Asteraceae), only parts of the families are complete. Genera within these four families are, however, complete.

Since the main contributors to the RDL were systematists with research knowledge of their particular taxonomic groups, a taxonomic, rather than geographic, approach was adopted for the compilation of the RDL. Although it is incomplete, I hope that this RDL will show clear trends that will be similar to the final, complete RDL.

The *Red Data List of southern African plants* (Hilton-Taylor 1996a, b, 1997) lists provincial assessments (Cape, Orange Free State, Natal and Transvaal) for each geopolitical area, along with national and global RDL assessments. The assessments in this new list are at the national level, but are obviously also global assessments where taxa are endemic to South Africa. Provincial assessments are not provided in this account of the South African RDL, because of the artificial nature of demarcating natural areas according to political boundaries.

Methods

The approach taken towards producing a new RDL for South Africa within a limited

period was to elicit co-operation from as many people as possible. National workshops were held to give potential collaborators an overview of the methodology of the IUCN (1994) system of assessing conservation status. The anticipated outcome of these workshops was to equip people with the knowledge required to provide useful information for the RDL. After these training workshops, I undertook follow-up visits with individual collaborators so that the information could be consolidated.

The following procedures were conducted for each taxonomic group:

- The names of the taxa already assessed in each taxonomic group included in this list were obtained from the SARARES database, an electronic version of Hilton-Taylor (1996a, b, 1997). This database is a compilation of plant species on the RDL, their assessments and accompanying notes, and is available on the SABONET website (<http://www.sabonet.org/reddatalist/database.html>).
- Nomenclatural updates were made. The most up-to-date scientifically correct names were provided by each specialist according to the latest revisions. These names match those used in the PRECIS database at the National Herbarium, Pretoria (PRE).
- Label information of all plant species collected in South Africa that are housed in PRE and stored in PRECIS provided distribution information to supplement data used in the assessments.
- Distributions were updated according to the new provincial boundaries.
- Additions (new or previously overlooked taxa) were incorporated.

Results and Discussion

A total of 948 taxa were assessed, of which 414 are threatened with extinction (Table 1). Most species fall into the *Vulnerable* (VU) category; some 270 of these (81%)

Capital: Pretoria (administrative capital), Cape Town (legislative capital)

Area: 1,220,088 km²

Languages: English, Xhosa, Zulu, Afrikaans, Ndebele, North Sotho, Sesotho, Swazi, Tsonga, Tswana, Venda (all official)

Currency: Rand

Total plant species: 23,420

Total plant endemics: no available information

Total RDL plants: 948

Focal RDL institutions: PRE

Number of Protected Areas: About 18 National Parks, including two Transfrontier Parks (Lesotho–South Africa and Mozambique–South Africa–Zimbabwe), numerous other protected areas, and several proposed protected areas (including Transfrontier Parks).

Population: 42,106,200 **Growth Rate:** 1.7% **Density:** 33.3 people/km²

Phytogeography: Cape in the south and southwest, Karoo–Namib in the west, Kalahari–Highveld Regional Transitional Zone in the centre, Zambezi elements in the north and east, Afromontane patches scattered in enclaves, and Tonga–Pondoland Regional Mosaic along the eastern coast.

Flora: Fynbos and its variants in the southwest, arid (Succulent Karoo) and semi-arid karoo shrubland and grassy shrubland in northern and central Cape, highveld grassland over much of the central plateau, open savanna woodland on the eastern plateau, montane forest and grasslands in enclaves, savanna and low-lying forest on the east coast.

Sources: Anonymous 2000, Cowling & Hilton-Taylor 1994, Low & Rebelo 1996

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are classified according to the D2 criterion, based on a narrow distribution area. Many species known only from their type localities—some of which may not even be taxonomically valid—fall into this category. It is expected that the number of species classified in this category will be reduced as future taxonomic work clarifies uncertainty or additional populations of rare species are discovered. *Data Deficient* (DD) listings are almost always due to taxonomic uncertainty.

Comparison of the RDL Assessments

As the new IUCN system is designed to target species that are going extinct rather than simply rare, many species previously listed as *Rare* (R) or *Insufficiently Known* (K) (Hilton-Taylor 1996a, b, 1997) are now listed as *Lower Risk* or VU D. The old R and K categories were applied to taxa with narrow distribution ranges and when populations were not known to be in decline or increasing; on the other hand, in this RDL compilation, only exceptionally narrowly restricted taxa qualify (and only as VU D) if the populations are stable, otherwise the *Lower-Risk* category applies.

Another important comparison is that taxa previously assessed as *Endangered* (E) have often been re-assessed as CR or EN, and those previously assigned as V are now usually EN or VU. Taxa previously listed as I have often been re-assessed as VU. The few *Critically Endangered* assessments are usually due to a continuing decline coupled with an extremely small distribution area.

Trends

The most commonly used criteria for assessing plant taxa are the B and D criteria, since these are based on size of distribution range rather than population num-

bers, the latter being very difficult to estimate for plants. Criterion D was used in cases where no decline was known; Criterion B was usually used in cases where an ongoing decline was suspected.

For each family assessed so far, there are fewer DDs than there were of the equivalent K and I categories in Hilton-Taylor's work. For example, in the Rutaceae there are now ten taxa listed as DD, whereas in Hilton-Taylor (1996a) seven taxa were listed as K and seven as I; this is because the IUCN (1994) system forces one to make a decision based on a minimum amount of available data. Estimating the exact extent of distribution has been problematic for the compilation of this RDL and thus, when no reasonable estimate could be made, the distribution was taken as the maximum area the species could reasonably inhabit. Then, if there was any reason to suspect a continuing decline to the population, Criterion B was applied.

Threatening Processes

So far, the major threats to the survival of the threatened species in South Africa appear to be agricultural activities that have historically done the most damage (in the grassland and lowland fynbos biomes), and at present, ongoing urbanisation. Whereas agricultural threats now operate on a much smaller scale than before, as most arable land is already transformed, harvesting of medicinal plants is on the increase because of greater accessibility (better roads and transport), growing population, and increase in economic potential. However, the effects of harvesting for medicinal purposes operate on a smaller scale and are often (but not always) targeted towards more common species. Very few medicinal plants have been assessed in this RDL compilation, and once this has been done, one

would be able to more fully interpret the effects of harvesting.

Illegal collecting for commercial trade is targeted towards specific taxonomic groups. It is still the main threat faced by sought-after groups such as cycads and many succulent groups, but fortunately, other taxa such as aloes are in relieve.

Conclusion

This RDL is far from complete and ongoing collaboration with specialists in a wide variety of fields is necessary to fill the present voids. Systematic researchers have proven to be very knowledgeable and have contributed greatly towards the first phase of the new RDL, but more co-operation from specialists with regional knowledge (conservationists, ecologists, and so forth) and knowledge in other disciplines (ethnobotany) is required to ensure the compilation of a comprehensive RDL.

Constant updating of information is necessary, requiring continual communication with the experts. Co-operation and communication are therefore vital for the success of the RDL, and to ensure the survival of South Africa's threatened plants.

Citation Taxonomic groups in the following list were assessed by the specialists who are currently most actively involved in researching or curating each group. When citing information pertaining to assessments of a particular family, the citation should list the family author in addition to J.E. Victor, for example, for the Cyperaceae, the correct citation is Archer, C. & Victor, J.E. 2002. Cyperaceae. In: J.S. Golding (ed.), *Southern African Plant Red Data Lists*. SABONET Report No 14: 100. C. Archer (Cyperaceae), J. Beyers (Thymelaeaceae), C.L. Bredenkamp (Thymelaeaceae), N. Govender (Gentianaceae), S.A. Hammer (Aizoaceae *pro parte*), P.P.J. Herman (Asteraceae *pro parte*), H. Kurzweil (Orchidaceae), B. Liltved (Orchidaceae), R. Peckover (Apocynaceae *pro parte*), P.B. Phillipson (Lobeliaceae), G.F. Smith (Aloaceae *pro parte*), Y. Singh (Apocynaceae *pro parte*), D. Snijman (Amaryllidaceae and Hypoxidaceae), T. Trinder-Smith (Rutaceae), H.J.T. Venter (Apocynaceae *pro parte*), W.G. Welman (Campanulaceae, Convolvulaceae, Cucurbitaceae, Dipsacaceae and Solanaceae), and C. Whitehouse (Rosaceae).

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Table 1. Number of taxa in each RDL category in South Africa.

RDL status	Number of taxa
Extinct (EX)	15
Critically Endangered (CR)	19
Endangered (EN)	58
Vulnerable (VU)	322
Lower-Risk near threatened (LR-nt)	92
Lower-Risk least concern (LR-lc)	334
Data Deficient (DD)	108
Total	948



***Serruria aemula*, found growing on acid sands in fynbos, is categorised as *Endangered*. (Hilton-Taylor, 1996a) (Photo J.S. Golding)**

EXTINCT & THREATENED

AIZOACEAE

Conophytum achabense S.A.Hammer

Status: VU D2

Endemism: Endemic

Threats: Mining

Distribution: Northern Cape

Conophytum acutum L.Bolus

Status: VU D2

Endemism: Endemic

Threats: Collection, grazing, habitat degradation

Distribution: Western Cape

If the decline is irreversible, the assessment will change to Endangered. Known to be illegally collected.

Conophytum auriflorum Tischer subsp.

turbiniforme (Rawé) S.A.Hammer

Status: VU D2

Endemism: Endemic

Distribution: Northern Cape

Conophytum burgeri L.Bolus

Status: VU D2

Endemism: Endemic

Threats: Collection, grazing, mining

Distribution: Northern Cape

Well-established in cultivation. Known to be roided by collectors, in which case probably CR or EN.

Conophytum herreanthus S.A.Hammer subsp. *herreanthus*

Status: CR A1acdB1B2abceC2bd1

Endemism: Endemic

Threats: Collection

Distribution: Northern Cape

Probably extinct now. Known to be illegally collected.

Conophytum phoeniceum S.A.Hammer

Status: VU D2

Endemism: Endemic

Threats: Road network

Distribution: Northern Cape

Collection low because established horticulturally and easy to grow.

Conophytum roodiae N.E.Br. subsp. *sanguineum* (S.A.Hammer) T.C.Smale

Conophytum rugosum S.A.Hammer subsp. *sanguineum*

S.A.Hammer

Status: VU D2

Endemism: Endemic

Threats: Grazing

Distribution: Northern Cape

Trompling due to grazing activity is a threat.

Conophytum schlechteri Schwantes

Status: VU D2

Endemism: Endemic

Distribution: Northern Cape

Conophytum semivestitum L.Bolus

Status: EX

Endemism: Endemic

Threats: Mining

Distribution: Northern Cape

Conophytum smorenskaduense de Boer subsp.

hermarium S.A.Hammer

Status: VU D2

Endemism: Endemic

Threats: Grazing

Distribution: Northern Cape

Affected by trompling.

Conophytum smorenskaduense de Boer subsp. *smorenskaduense*

Status: VU D2

Endemism: Endemic

Threats: Grazing

Distribution: Northern Cape

Affected by trompling.

Conophytum uviforme (Haw.) N.E.Br. subsp. *subincanum* (Tischer) S.A.Hammer

Status: VU D2

Endemism: Endemic

Threats: Mining

Distribution: Western Cape

Conophytum vanheerdei Tischer

Status: VU D2

Endemism: Endemic

Distribution: Northern Cape

ALOACEAE

Aloe albidia (Stapf) Reynolds

Status: VU A1c

Endemism: Endemic

Threats: Fire, collection

Distribution: Mpumalanga

Restricted distribution in mist belt near Borberton.

Known to be illegally collected.

Aloe bowiea Schult.f.

Status: CR A1aceB1B2abcde

Endemism: Endemic

Threats: Urban expansion, habitat degradation

Distribution: Eastern Cape

Will remain at only one location when Coego harbour is completed.

Aloe brevifolia Mill.

Status: VU A1c

Endemism: Endemic

Distribution: Western Cape

Aloe bukhii Lavranos

Status: VU D2

Endemism: Endemic

Distribution: Northern Cape

Aloe chlorantha Lavranos

Status: EN B1B2e

Endemism: Endemic

Distribution: Northern Cape

Aloe comosa Marl. & A.Berg

Status: VU B1B2c

Endemism: Endemic

Distribution: Western Cape, Northern Cape

Aloe dabenorisana van Jaarsv.

Status: VU D2

Endemism: Endemic

Distribution: Northern Cape

Aloe distans Haw.

Status: EN B1B2e

Endemism: Endemic

Distribution: Western Cape

Aloe fouriei D.S.Hardy & Glen

Status: VU D2

Endemism: Endemic

Distribution: Mpumalanga

Aloe gerstneri Reynolds

Status: VU B1B2abcde

Endemism: Endemic

Distribution: KwaZulu-Natal

Aloe hardyi Glen

Status: VU D2

Endemism: Endemic

Distribution: Mpumalanga

This species is safe because of its inaccessible habitat.

Aloe inconspicua Plowes

Status: VU D2

Endemism: Endemic

Distribution: KwaZulu-Natal

Aloe khamiesensis Pillans

Status: VU B1B2e

Endemism: Endemic

Threats: Collection

Distribution: Northern Cape

Mountainous region of Namaqualand; threatened by illegal collection.

Aloe longistylia Baker

Status: VU A1acd

Endemism: Endemic

Threats: Collection, grazing

Distribution: Western Cape, Eastern Cape

Known to be illegally collected.

Aloe meyeri van Jaarsv.

Status: VU D2

Endemism: Endemic

Distribution: Northern Cape

Aloe micracantha Haw.

Status: VU A1aceB1B2ac

Endemism: Endemic

Threats: Urban expansion, agriculture, alien plant infestation

Distribution: Eastern Cape

Grossy fynbos, Uniondale to Grahamstown. Threatened by agriculture and urbanisation.

Aloe monotropa Verdoorn

Status: VU D2

Endemism: Endemic

Threats: Mining, collection

Distribution: Limpopo Province

Known to be illegally collected.

Aloe nubigena Groenewald

Status: VU D2

Endemism: Endemic

Distribution: Mpumalanga

Aloe pearsonii Schonland

Status: EN B1B2abcde

Endemism: Endemic

Threats: Agriculture, grazing

Distribution: Northern Cape

Many plants, but no recruitment. Trompling due to grazing activity is a threat.

Aloe peglerae Schonland

Status: EN A1acdeB1B2bce

Endemism: Endemic

Threats: Collection, habitat degradation

Distribution: Gauteng, North-West

Localised near densely populated areas.

Aloe petrophila Pillans

Status: VU D2

Endemism: Endemic

Distribution: Limpopo Province

Cliff dweller.

Aloe pictifolia D.S.Hardy

Status: VU D2

Endemism: Endemic

Distribution: Eastern Cape

Safe because of inaccessibility.

Aloe pillansii Guthrie

Status: CR A2ace

Threats: Collection, disease

Distribution: Northern Cape
Bulk of plants grow in herding area, from Eksteenfontein to border of Namibia. Many more dead plants than seedlings. In Namibia, threatened by base metal mining. Predation by porcupines and boboons has been noted. Disease (leaf scorch) has also been reported.

***Aloe pratensis* Baker**

Status: VU B1B2bce
Endemism: Endemic
Threats: Agriculture, collection
Distribution: Eastern Cape, KwaZulu-Natal
Reported to be collected for medicinal purposes.

***Aloe prinslooii* Verdoorn & Hardy**

Status: VU A1cd
Endemism: Endemic
Threats: Collection
Distribution: KwaZulu-Natal
Tugelo Basin endemic. Collectors have had severe impacts in the past.

***Aloe pruinosa* Reynolds**

Status: VU A1acdeB1B2abceD2
Endemism: Endemic
Threats: Urban expansion, habitat degradation
Distribution: KwaZulu-Natal

***Aloe ramosissima* Pillans**

Status: VU A1ce
Endemism: Endemic
Threats: Grazing
Distribution: Northern Cape
Unexploited dead plants near Helshoogte and Helskloof.
Trampling due to grazing activity is a threat.

Aloe reitzii* Reynolds var. *reitzii

Status: VU D2
Endemism: Endemic
Distribution: Mpumalanga

***Aloe reitzii* Reynolds var. *vernalis* D.S.Hardy**

Status: VU D2
Endemism: Endemic
Distribution: KwaZulu-Natal

***Aloe reynoldsii* Letty**

Status: VU A1cd2
Endemism: Endemic
Threats: Habitat degradation
Distribution: Eastern Cape

***Aloe saundersiae* (Reynolds) Reynolds**

Status: EN B1B2bcd
Endemism: Endemic
Threats: Afforestation, agriculture
Distribution: KwaZulu-Natal

***Aloe simii* Pole Evans**

Status: EN B1B2b
Endemism: Endemic
Threats: Afforestation, agriculture
Distribution: Mpumalanga

***Aloe soutpansbergensis* Verdoorn**

Status: VU B1B2be
Endemism: Endemic
Threats: Collection
Distribution: Limpopo Province

***Aloe striata* Haw. var. *komaggasensis* (Kritzing)**

& van Jaarsv.) Glen & D.S.Hardy
Status: VU D2
Endemism: Endemic
Threats: Collection, grazing
Distribution: Northern Cape

***Aloe thompsoniae* Groenewald**

Status: EN B1B2e
Endemism: Endemic
Threats: Collection
Distribution: Limpopo Province

***Aloe thorncroftii* Pole Evans**

Status: VU D2
Endemism: Endemic
Distribution: Mpumalanga

***Aloe vossii* Reynolds**

Status: EN B1B2bcde
Endemism: Endemic
Threats: Alien plant infestation, fire, grazing/browsing
Distribution: Limpopo Province
Trampling by cattle is a threat.

AMARYLLIDACEAE

***Amaryllis paradisicola* Snijman**

Status: VU D2
Endemism: Endemic
Threats: Browsing
Distribution: Northern Cape
Boboons reported to damage fruiting heads.

***Apodolirion cedarbergense* D.Mull.-Doblies**

Status: VU D2
Endemism: Endemic
Threats: Browsing
Distribution: Western Cape
Flowers are eaten by wild animals.

***Brunsvigia elandsmontana* Snijman**

Status: VU D2
Endemism: Endemic
Threats: Grazing/browsing
Distribution: Western Cape
Trampling by wild game is a threat.

***Brunsvigia gydobergensis* D. & U.Mull.-Doblies**

Status: EX
Endemism: Endemic
Distribution: Western Cape
This may have been a small-flowered form of the widespread *B. josephinae*.

***Brunsvigia herrei* Leight. ex W.F.Barker**

Status: VU B1B2e
Threats: Collection, grazing/browsing
Distribution: Northern Cape
Trampling by goats is a threat.

***Brunsvigia litoralis* R.A.Dyer**

Status: EN B1B2c
Endemism: Endemic
Threats: Urban expansion, habitat degradation
Distribution: Eastern Cape
The upright leaves are mowed in coastal gardens, reducing the storage capacity of the bulbs. Coastal development is a threat.

***Brunsvigia radula* Aiton**

Status: EN A2c
Endemism: Endemic
Threats: Collection, mining
Distribution: Northern Cape

***Crinum lineare* L.f.**

Status: VU B1B2abc
Endemism: Endemic
Threats: Urban expansion, alien plant infestation
Distribution: Eastern Cape
Habitat is becoming degraded.

***Cyrtanthus carneus* Lindl.**

Status: VU D2
Endemism: Endemic
Threats: Agriculture, collection
Distribution: Western Cape
Populations are never large. The plants grow as a few scattered individuals. Known to be illegally collected.

***Cyrtanthus flammosus* Snijman & van Jaarsv.**

Status: VU D2
Endemism: Endemic
Distribution: Eastern Cape

***Cyrtanthus guthrieae* L.Bolus**

Status: VU D2
Endemism: Endemic
Threats: Collection, grazing/browsing
Distribution: Western Cape
Dependent on fire to flower. Known to be illegally collected. Sheep forming activity is a threat.

***Cyrtanthus leptosiphon* Snijman**

Status: CR B1B2bc
Endemism: Endemic
Threats: Agriculture
Distribution: Western Cape
Depends on fire to flower.

***Cyrtanthus odoratus* Ker Gawl.**

Status: VU D2
Endemism: Endemic
Distribution: Western Cape
Depends on fire to flower. Not often seen.

***Cyrtanthus spiralis* Burch. ex Ker Gawl.**

Status: EN B1B2abc
Endemism: Endemic
Threats: Habitat degradation
Distribution: Eastern Cape
Its habitat has become steadily degraded. Habitat degradation evident at most of the known localities. Not easy to cultivate.

***Cyrtanthus suaveolens* Schonland**

Status: EN B1B2abc
Endemism: Endemic
Threats: Afforestation
Distribution: Eastern Cape
Depends on fire to flower.

***Cyrtanthus wellandii* Snijman**

Status: VU D2
Endemism: Endemic
Threats: Collection
Distribution: Eastern Cape
Known to be illegally collected.

***Gethyllis barkerae* D.Mull.-Doblies**

Status: EN B1B2ce
Endemism: Endemic
Threats: Collection, grazing
Distribution: Western Cape
The differences between the subspecies do not hold up in recent collections. Coastal development is a threat.

Gethyllis lata* L.Bolus subsp. *lata

Status: VU D2
Endemism: Endemic
Threats: Collection
Distribution: Western Cape, Northern Cape
Known to be illegally collected.

***Gethyllis lata* L.Bolus subsp. *orbicularis* D.Mull.-Doblies**

Status: VU D2
Endemism: Endemic
Threats: Collection
Distribution: Northern Cape
Known to be illegally collected.

***Gethyllis pectinata* D.Mull.-Doblies**

Status: CR B1B2abceC2b
Endemism: Endemic
Threats: Collection, grazing
Distribution: Northern Cape
Only known from the type locality. Known to be illegally collected. Sheep forming activity is a threat.

***Haemanthus amarylloides* Jacq. subsp.**

***toximontanus* Snijman**
Status: EN B1B2bc
Endemism: Endemic
Threats: Collection, grazing/browsing
Distribution: Western Cape
In March 2001 it was noticed that further ploughing near the site had disturbed the drainage system. Known to be illegally collected. Trampling activity is a threat.

Haemanthus canaliculatus* Levyns*Status:** EN B1B2C1

Endemism: Endemic

Threats: Collection, urban expansion

Distribution: Western Cape

Residential development has been impacting the subpopulation in the last 10 years. Housing development is a threat due to drainage alteration. Illegal collection is a threat.

Haemanthus graniticus* Snijman*Status:** VU B1B2abc

Endemism: Endemic

Threats: Collection, agriculture

Distribution: Northern Cape

Ploughed land is destroying subpopulations in the Komiesberg. Known to be illegally collected.

Haemanthus namaquensis* R.A.Dyer*Status:** VU B1B2e

Endemism: Endemic

Threats: Collection

Distribution: Northern Cape

Known to be illegally collected.

Haemanthus nortieri* Isaac*Status:** EN B1B2bce

Endemism: Endemic

Threats: Collection, grazing/browsing, road network

Distribution: Western Cape

Known to be illegally collected. Trompling activity is a threat.

Haemanthus pubescens* L.f. subsp. *leipoldtii**Snijman****Status:** VU D2

Endemism: Endemic

Threats: Urban expansion

Distribution: Western Cape

Haemanthus pumilio* Jacq.*Status:** EN A1acdC1

Endemism: Endemic

Threats: Collection, agriculture

Distribution: Western Cape

Used to occur at base of Klein Drogenstein and Stellenbosch Flats, now locally extinct at these sites. Known to be illegally collected. Wheat forming is considered a threat.

Hessee cinnamomea* (L'Her.) T.Durand & Schinz*Status:** EN A1ac

Endemism: Endemic

Threats: Urban expansion

Distribution: Western Cape

Hessee mathewsii* W.F.Barker*Status:** EN B1B2abc

Endemism: Endemic

Threats: Grazing/browsing, urban expansion

Distribution: Western Cape

Major subpopulation at Vredenburg being encroached upon by housing.

Hessee pusilla* Snijman*Status:** VU D2

Endemism: Endemic

Distribution: Northern Cape

Hessee tenuipedicellata* SnijmanHessee* sp. Snijman 1437**Status:** VU D2

Endemism: Endemic

Distribution: Northern Cape

The subpopulation showed disturbance from porcupine digging.

Hessee undosa* Snijman*Status:** VU D2

Endemism: Endemic

Threats: Desiccation

Distribution: Western Cape

Occur on farmlands in non-arable areas. Extreme drought is reported as a threat.

Namaquanula bruce-bayeri* D. & U.Mull.-DobliesHessee bruce-bayeri* (D. & U.Mull.-Doblies) Snijman**Status:** VU B1B2bc

Threats: Grazing/browsing, mining

Distribution: Northern Cape

Heavy grazing by increasing numbers of goats and diamond mining are reported as threats.

Nerine gracilis* R.A.Dyer*Status:** VU B1B2abc

Endemism: Endemic

Threats: Erosion, grazing/browsing

Distribution: Mpumalanga, Gauteng

Heavy grazing by domestic stock is considered a problem.

Nerine huttoniae* Schonland*Status:** VU D2

Endemism: Endemic

Threats: Agriculture, habitat degradation

Distribution: Eastern Cape

Habitat reduced due to intensive habitat transformation.

Nerine marincowitzii* Snijman*Status:** VU D2

Endemism: Endemic

Threats: Erosion, collection

Distribution: Western Cape

A fence has been erected around the subpopulation to exclude domestic stock. Habitat is prone to excessive flooding due to soil erosion in the catchment area.

Bulbs are eaten by boboons.

Nerine masoniorum* L.Bolus*Status:** EN B1B2ab

Endemism: Endemic

Threats: Habitat degradation, grazing/browsing, urban expansion

Distribution: Eastern Cape

Only a single locality, currently being converted to an urban landscape. Close proximity to informal settlement and grazing by domestic stock are problems.

Strumaria aestivalis* Snijman*Status:** VU D2

Endemism: Endemic

Threats: Collection

Distribution: Northern Cape

Known to be illegally collected by bulb enthusiasts.

Strumaria chaplinii* (W.F.Barker) Snijman*Status:** EN B1B2bc

Endemism: Endemic

Threats: Habitat degradation, urban expansion

Distribution: Western Cape

Degradation of the sites due to proximity to housing.

Strumaria leipoldtii* (L.Bolus) Snijman*Status:** VU D2

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape

Locality in close proximity to a refuse dump.

Strumaria perryae* Snijman*Status:** VU D2

Endemism: Endemic

Distribution: Northern Cape

Strumaria unguiculata* (W.F.Barker) Snijman*Status:** VU D2

Endemism: Endemic

Threats: Road network, collection

Distribution: Northern Cape

The rarity and large-sized flowers of this species makes it popular with bulb collectors.

Threats: Grazing, habitat degradation

Distribution: Eastern Cape

Striking yellow flowers. Grows with B. meyerianum. It could not be found at the type locality. Found in rocky areas where it is safe.

Brachystelma campanulatum* N.E.Br.*Status:** VU A1c

Endemism: Endemic

Threats: Agriculture

Distribution: Eastern Cape

Large bell-shaped flowers. Found with B. delicatum. More fieldwork needed to ascertain its exact distribution. Cultivation of pineapples and other crops threatens this species.

Brachystelma dimorphum* R.A.Dyer subsp. *gratum**R.A.Dyer****Status:** VU D2

Endemism: Endemic

Distribution: Free State

Possibility that there could be many more sites; potential habitats numerous between Welkom and Bloemfontein.

Brachystelma discoideum* R.A.Dyer*Status:** VU B1B2bcd

Threats: Urban expansion, agriculture

Distribution: Gauteng, Mpumalanga, North-West

Type locality at Soutpou is now informal settlement. Related to B. incanum.

Brachystelma dyeri* K.Balkwill & M.Balkwill*Status:** VU D2

Endemism: Endemic

Distribution: Mpumalanga

Brachystelma franksiae* N.E.Br.*Status:** EN B1B2abcd

Endemism: Endemic

Threats: Urban expansion, agriculture

Distribution: KwaZulu-Natal

Brachystelma kerzneri* Peckover*Status:** VU D2

Endemism: Endemic

Threats: Alien plant infestation, habitat degradation

Distribution: Eastern Cape

Lock of fire has transformed community structure of habitat.

Brachystelma meyerianum* Schltr.*Status:** EN B1B2bcde

Endemism: Endemic

Threats: Grazing, collection

Distribution: Eastern Cape

Closely related to B. tuberosum but with yellowish/pinkish flowers. Grows with B. caffrum, but the species have different pollinators. Known to be illegally collected.

Brachystelma moleventi* Peckover & Van Wyk*Status:** VU D2

Endemism: Endemic

Distribution: Eastern Cape

Brachystelma montanum* R.A.Dyer*Status:** VU D2

Endemism: Endemic

Distribution: Eastern Cape

Probably not threatened (tops of mountains). Flowers similar to B. occidentale from Bredasdorp.

Brachystelma natalense* (Schltr.) N.E.Br.*Status:** VU D2

Endemism: Endemic

Threats: Urban expansion

Distribution: KwaZulu-Natal

Brachystelma ngomense* R.A.Dyer*Status:** VU D2

Endemism: Endemic

Distribution: KwaZulu-Natal

Vegetatively similar to B. coddii. Upright bell-shaped

APOCYNACEAE

Brachystelma caffrum* (Schltr.) N.E.Br.*Status:** CR B1B2abcdC2ab

Endemism: Endemic

flower. Non-oroble habitat ensures safety from forming activities.

***Brachystelmo occidentale* Schltr.**

Status: CR D1

Endemism: Endemic

Threats: Urban expansion

Distribution: Western Cape

Related to *B. delicatum*.

***Brachystelma tenue* R.A.Dyer**

Status: EN A1acB1B2abc

Endemism: Endemic

Threats: Agriculture, afforestation

Distribution: KwaZulu-Natal

***Brachystelmo vohrmeijeri* R.A.Dyer**

Status: EN A1acB1B2abc

Endemism: Endemic

Threats: Agriculture, afforestation

Distribution: KwaZulu-Natal

***Ceropegia antennifera* Schltr.**

Status: EX

Endemism: Endemic

Distribution: KwaZulu-Natal

***Ceropegia cimiciflora* Oberm.**

Status: VU A1c

Endemism: Endemic

Threats: Agriculture

Distribution: KwaZulu-Natal, Limpopo Province

Probably two varieties.

***Ceropegia cynniflora* R.A.Dyer**

Status: VU D2

Endemism: Endemic

Distribution: KwaZulu-Natal

Ceropegia decidua* E.A.Bruce subsp. *pretoriensis

R.A.Dyer

Status: CR B1B2bcde

Endemism: Endemic

Threats: Alien plant infestation, urban expansion

Distribution: Gauteng

Housing development is a threat.

***Ceropegia insignis* R.A.Dyer**

Status: VU D2

Endemism: Endemic

Distribution: North-West, Limpopo Province

Ceropegia radicans* Schltr. subsp. *smithii

Status: VU D2

Endemism: Endemic

Distribution: Eastern Cape

May be a hybrid between *C. radicans* and

C. sandersonii.

***Cryptolepis delagoensis* Schltr.**

Status: VU D2

Distribution: KwaZulu-Natal

***Ectadium virgatum* E.Mey.**

Status: VU D2

Threats: Agriculture

Distribution: Northern Cape

***Mondia whitei* (Hook.f.) Skeels**

Status: VU A1dD2

Threats: Collection

Distribution: KwaZulu-Natal

Used widely and excessively for medicinal purposes.

***Raphionocme chimanimoniano* Venter & R.L.Verh.**

Status: VU D2

Threats: Grazing/browsing

Distribution: Limpopo Province

Possible trampling and grazing by cattle may be a threat.

***Raphionocme elsana* Venter & R.L.Verh.**

Status: EN B1B2abc

Endemism: Endemic

Threats: Habitat degradation, grazing/browsing, urban expansion

Distribution: KwaZulu-Natal

Grows in open savanna on red clay. Subsistence farming of crops and activities of cattle and goats are problems.

***Raphionocme lobulata* Venter & R.L.Verh.**

Status: VU D2

Endemism: Endemic

Threats: Urban expansion

Distribution: Eastern Cape

Banks of the Kop River. Exists in an urban environment.

***Rophionocme lucens* Venter & R.L.Verh.**

Status: EN B1B2bc

Threats: Afforestation

Distribution: KwaZulu-Natal

Threatened by pine plantations.

ASTERACEAE

***Anaxeton ongustifolium* Lundgren**

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Rocky mountain slopes.

***Arctotis dregei* Turcz.**

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

***Arctotis fosteri* N.E.Br.**

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

***Arctotis mocosperma* (DC.) Lewin**

Status: VU D2

Endemism: Endemic

Distribution: Western Cape?

***Aster loevigotus* (Sond.) O.Kuntze**

Status: VU D2

Endemism: Endemic

Distribution: Eastern Cape

Only known from type collection; not collected during 20th century.

***Aster nubimontis* Lippert**

Status: VU D2

Endemism: Endemic

Distribution: Limpopo Province

Only known from type collection; collected in 1961.

***Athanasia capitata* (L.) L.**

Status: VU B1B2abc

Endemism: Endemic

Distribution: Western Cape

It seems to have become very rare, especially on the Cape Peninsula.

***Athonosio inopinata* (Hutch.) Källersjö**

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Athanasia quinqueidentata* Thunb. subsp. *rigens

Källersjö

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

***Athanasio rugulosus* E.Mey. ex DC.**

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

***Athanasio sertuliferus* DC.**

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Grows on dry flocs.

***Athanasia spothulota* (DC.) D.Dietr.**

Status: VU D2

Endemism: Endemic

Distribution: Northern Cape

***Chrysocoma esterhuysenii* Bayer**

Status: VU D2

Endemism: Endemic

Threats: Urban expansion

Distribution: Western Cape

***Cotula duckittiae* (L.Bolus) Bremer & Humphries**

Cenia duckittiae L.Bolus

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Already assessed as Endangered in 1971 because of development, agriculture and flower picking for flower shows.

***Cotula logonii* Hutch.**

Status: VU D2

Endemism: Endemic

Distribution: Western Cape?

***Cotula myriophylloides* Harv.**

Status: VU D2

Endemism: Endemic

Threats: Urban expansion

Distribution: Western Cape

***Cotula paradoxa* Schinz**

Status: VU D2

Endemism: Endemic

Distribution: Western Cape?

***Cotula pedunculata* (Schltr.) Phill.**

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

***Dimorphotheca wollionia* (Nol.) B.Nord.**

Osteospermum wollianum Nol.

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Only known from type collection (1938).

***Euryops brevipes* B.Nord.**

Status: VU D2

Endemism: Endemic

Distribution: KwaZulu-Natal

Only known from type specimen collected in 1956.

***Euryops ciliatus* B.Nord.**

Status: VU D2

Endemism: Endemic

Distribution: Eastern Cape

Not found during the 20th century; possibly extinct.

***Euryops decipiens* Schltr.**

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Very restricted distribution.

***Euryops dentatus* B.Nord.**

Status: VU D2

Endemism: Endemic

Distribution: Eastern Cape

Not collected again during the 20th century; known from only two collections.

***Euryops gracilipes* B.Nord.**

Status: VU D2

Endemism: Endemic

Distribution: Eastern Cape

Only known from type collection. Unusual flowering time and inconspicuous habit may be why the species has not been collected more often.

***Euryops hypnoides* B.Nord.**

Status: VU D2

Endemism: Endemic

Distribution: Eastern Cape
Restricted distribution.

Euryops indecorus B.Nord.
Status: VU D2
Endemism: Endemic
Distribution: Western Cape
Restricted distribution.

Euryops integrifolius B.Nord.
Status: VU D2
Endemism: Endemic
Distribution: Western Cape
Possibly a high montane derivative of E. munitus.

Euryops mirus B.Nord.
Status: VU D2
Endemism: Endemic
Distribution: Northern Cape
Grows on more or less flat ground in a deep layer of heavy, much granulated clay mixed with sand.

Euryops muiirii C.A.Sm.
Status: VU D2
Endemism: Endemic
Distribution: Western Cape
Only known from type collection.

Euryops pectinatus (L.) Cass. subsp. lobulatus B.Nord.
Status: VU D2
Endemism: Endemic
Distribution: Western Cape
Restricted distribution.

Euryops pleiodontus B.Nord.
Status: VU D2
Endemism: Endemic
Distribution: Western Cape?
Only known from type specimens; not collected during 20th century.

Euryops rosulatus B.Nord.
Status: VU D2
Endemism: Endemic
Distribution: Northern Cape
Rare, restricted distribution.

Euryops subcarnosus DC. subsp. minor B.Nord.
Status: VU D2
Endemism: Endemic
Distribution: Northern Cape
Restricted distribution.

Euryops ursinoides B.Nord.
Status: VU D2
Endemism: Endemic
Distribution: Eastern Cape

Euryops virgatus B.Nord.
Status: VU D2
Endemism: Endemic
Distribution: Northern Cape
Grows in open, flat veld in deep layer of much granulated clay.

Euryops zeyheri B.Nord.
Status: VU D2
Endemism: Endemic
Distribution: Western Cape?
Exact locality unknown; only known from two collections; not collected during 20th century.

Felicia annectens (Harv.) Grau
Status: EX
Endemism: Endemic
Distribution: Northern Cape
Not collected during the 20th century.

Felicia deserti Schltr.
Status: VU D2
Endemism: Endemic
Distribution: Northern Cape

Felicia diffusa (DC.) Grau subsp. khamiesbergensis Grau
Status: VU D2
Endemism: Endemic
Distribution: Northern Cape
Only known from type collection.

Felicia ebracteata Grau
Status: VU D2
Endemism: Endemic
Distribution: Western Cape

Felicia elongata (Thunb.) O.Hoffm.
Status: VU D2
Endemism: Endemic
Distribution: Western Cape

Felicia esterhuyseniae Grau
Status: VU D2
Endemism: Endemic
Distribution: Western Cape

Felicia fruticosa (L.) Nichols. subsp. brevipedunculata (Hutch.) Grau
Status: VU D2
Endemism: Endemic
Distribution: Limpopo Province

Felicia nigrescens Grau
Status: VU D2
Endemism: Endemic
Distribution: Western Cape
Only known from type collection; not collected during the 20th century.

Felicia nordenstamii Grau
Status: VU D2
Endemism: Endemic
Distribution: Western Cape

Felicia tsitsikamae Grau
Status: VU D2
Endemism: Endemic
Distribution: Eastern Cape

Felicia wrightii Hilliard & B.L.Burt
Status: VU D2
Endemism: Endemic
Distribution: KwaZulu-Natal

Gnaphalium griquense Hilliard & B.L.Burt
Status: VU D2
Distribution: KwaZulu-Natal
In damp places.

Helichrysum alticolum Bolus
Status: VU D2
Endemism: Endemic
Threats: Alien plant infestation, agriculture, grazing
Distribution: Eastern Cape

Helichrysum aureum (Houtt.) Merr. var. argenteum Hilliard
Status: VU D2
Endemism: Endemic
Distribution: KwaZulu-Natal

Helichrysum citricephalum Hilliard & B.L.Burt
Status: CR B1B2c
Endemism: Endemic
Threats: Agriculture, afforestation
Distribution: KwaZulu-Natal
Only known locality destroyed by roadworks, could therefore be extinct.

Helichrysum fourcadei Hilliard
Status: VU D2
Endemism: Endemic
Threats: Agriculture, grazing
Distribution: Western Cape, Eastern Cape

Helichrysum haygarthii Bolus
Status: VU D2
Endemism: Endemic

Threats: Grazing
Distribution: Free State, KwaZulu-Natal

Helichrysum ingomense Hilliard
Status: VU D2
Endemism: Endemic
Threats: Agriculture, afforestation
Distribution: KwaZulu-Natal

Helichrysum nimbicola Hilliard
Status: VU D2
Distribution: Eastern Cape

Helichrysum solitarium Hilliard
Status: VU D2
Endemism: Endemic
Distribution: Western Cape
Only known from type collection.

Heterolepis mitis (Burm.) DC.
Status: VU D2
Endemism: Endemic
Distribution: Eastern Cape

Hippia hirsuta DC.
Status: VU D2
Endemism: Endemic
Distribution: Western Cape

Inezia speciosa Brusse
Status: VU D2
Endemism: Endemic
Distribution: Limpopo Province

Lasiopogon minutus (B.Nord.) Hilliard & B.L.Burt
Status: VU D2
Endemism: Endemic
Distribution: Northern Cape

Macowania conferta (Benth.) Phillips
Status: VU D2
Endemism: Endemic
Distribution: KwaZulu-Natal

Macowania deflexa Hilliard & B.L.Burt
Status: VU D2
Endemism: Endemic
Distribution: KwaZulu-Natal

Macowania hamata Hilliard & B.L.Burt
Status: VU D2
Endemism: Endemic
Distribution: KwaZulu-Natal

Marasmodes duemmeri Bolus ex Hutch.
Status: VU D2
Endemism: Endemic
Threats: Urban expansion
Distribution: Western Cape

Marasmodes oligocephalus DC.
Status: VU D2
Endemism: Endemic
Distribution: Western Cape

Marasmodes undulata Compton
Status: VU D2
Endemism: Endemic
Distribution: Western Cape

Oncosiphon schlechteri (Bolus) Källersjö
Matricaria schlechteri Bolus ex Schltr.
Status: VU D2
Endemism: Endemic
Distribution: Western Cape

Osteospermum aciphyllum DC.
Status: VU D2
Endemism: Endemic
Distribution: Western Cape

Osteospermum elsiae Norl.
Status: VU D2
Endemism: Endemic

Distribution: Western Cape

Osteospermum hafstroemii Norl

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Osteospermum hirsutum Thunb.

Status: EX

Endemism: Endemic

Distribution: Western Cape?

Osteospermum hispidum Harv. var. *viride* Norl

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Osteospermum pterigoideum Klatt

Status: VU D2

Endemism: Endemic

Distribution: Western Cape, Eastern Cape

Othonna cacalioides L.f.

Status: VU D2

Endemism: Endemic

Distribution: Western Cape, Northern Cape

Othonna cakilefolia DC.

Status: VU D2

Endemism: Endemic

Distribution: Northern Cape, Western Cape

Othonna hallii B.Nord.

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Othonna lepidocaulis Schltr.

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Othonna membranifolia DC.

Status: VU D2

Endemism: Endemic

Distribution: Eastern Cape

Othonna papaveroides Hutch.

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Othonna patula Schltr.

Status: VU D2

Endemism: Endemic

Distribution: Eastern Cape

Othonna rechingeri B.Nord.

Status: VU D2

Endemism: Endemic

Distribution: Northern Cape

Othonna spinescens DC.

Status: VU D2

Endemism: Endemic

Phymaspermum argenteum Brusse

Status: VU D2

Endemism: Endemic

Distribution: Limpopo Province

Phymaspermum erubescens (Hutch.) Källersjö

Status: VU D2

Endemism: Endemic

Threats: Agriculture

Distribution: Eastern Cape

Phymaspermum villosum (Hilliard) Källersjö

Athanasia villosa Hilliard

Status: VU D2

Endemism: Endemic

Distribution: KwaZulu-Natal, Eastern Cape

Pteronia diosmifolia Brusse

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Pteronia pillansii Hutch.

Status: VU D2

Endemism: Endemic

Distribution: Northern Cape, Western Cape

Pteronia scabra Harv.

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Senecio albopunctatus Bolus

Status: VU D2

Endemism: Endemic

Threats: Habitat degradation

Distribution: Northern Cape

Lost collected in 1883.

Senecio eminens Compton

Status: VU D2

Distribution: Mpumalanga

Lost collected in 1949.

Senecio scaposus DC. var. *addoensis* (Compton)

G.D.Rowley

Status: VU D2

Endemism: Endemic

Distribution: Eastern Cape

Lost collected in 1933.

Senecio serruroides Turcz.

Status: VU D2

Endemism: Endemic

Distribution: Eastern Cape

Lost collected in 1830.

Senecio wittebergensis Compton

Status: VU D2

Endemism: Endemic

Threats: Agriculture, grazing

Distribution: Western Cape

Steirodiscus schlechteri Bolus ex Schltr.

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Steirodiscus speciosus (Pillans) B.Nord.

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Syncarpha recurvata (L.f.) B.Nord.

Helichrysum recurvatum (L.f.) Thunb.

Status: VU D2

Endemism: Endemic

Threats: Urban expansion, harvesting

Distribution: Eastern Cape

Exploited as o cut flower.

Vellereophyton felinum Hilliard

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Known only from the type collection.

Vellereophyton lasianthum (Schltr. & Moeser)

Hilliard

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Vellereophyton pulvinatum Hilliard

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Known only from type collection.

Vernonia africana (Sond.) Druce

Status: EX

Endemism: Endemic

Threats: Agriculture, urban expansion

Distribution: KwaZulu-Natal

Zyrphelis decumbens (Schltr.) Nesom

Mairia decumbens Schltr.

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

CAMPANULACEAE

Roella goodiana Adamson

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Wahlenbergia brehmeri Lammers

Wahlenbergia rotundifolia Brehmer

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Wahlenbergia microphylla (Adamson) Lammers

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Known from type only.

Wahlenbergia tetramera Thulin

Status: VU D2

Endemism: Endemic

Distribution: KwaZulu-Natal

Wahlenbergia umbellata (Adamson) Lammers

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Known from type only.

CUCURBITACEAE

Acanthosicyos horridus Welw. ex Hook.f.

Status: VU D2

Distribution: Northern Cape

Edible seeds, exported in the past; Nama people around Swakopmund utilise this in Namibia as an important faad crop. In Walvis Bay, the lowered water table may affect this species.

Cucumis humifructus Stent

Status: EN B1B2abcde

Endemism: Endemic

Threats: Urban expansion

Distribution: Limpopo Province, Gauteng

Also in Tropical Africa. Symbiotic relationship with oardvark. Bialogy dependent on oordvark, but aardvark population declining.

Gerrardanthus tomentosus Hook.f.

Status: VU B1B2bcd2

Distribution: KwaZulu-Natal

CYPERACEAE

Carex acocksi C.Archer

Status: VU D2

Endemism: Endemic

Distribution: Northern Cape

Only known from type locality, growing in daleritic soil, but could occur an nearby mountains.

Trianoptiles solitaria (C.B.Clarke) Levyns

Ecklonia solitaria C.B.Clarke

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

Recently recorded introduction to Australia.

HYPOXIDACEAE

Hypoxis patula Nel
Status: VU D2
Endemism: Endemic
Threats: Agriculture
Distribution: Mpumalanga

Hypoxis uniflora Mark.
Status: VU D2
Endemism: Endemic
Threats: Agriculture
Distribution: Free State
Known only from type locality and collection in 1907.

Pauridia longituba M.F.Thops.
Status: VU B1B2abcd
Endemism: Endemic
Threats: Urban expansion, habitat degradation
Distribution: Western Cape
Threatened by ongoing housing development.

Spiloxene canaliculata Garside
Status: VU B1B2abcd
Endemism: Endemic -
Threats: Alien plant infestation, urban expansion
Distribution: Western Cape
Encroachment of alien grasses is a threat.

Spiloxene minuta (L.) Fourc.
Status: VU B1B2abcd
Endemism: Endemic
Threats: Urban expansion, habitat degradation
Distribution: Western Cape
The management of private nature reserves does not always suit the survival of tiny geophytes. Few of the subpopulations recorded in herbario still exist due to urban sprawl.

Spiloxene umbraticola (Schltr.) Garside
Spiloxene maximiliani (Schltr.) Garside
Status: VU B1B2abcd
Endemism: Endemic
Threats: Agriculture
Distribution: Northern Cape, Western Cape

LOBELIACEAE

Cyphia salteri E.Wimm.
Status: VU D2
Endemism: Endemic
Distribution: Western Cape

Cyphia stephensiae E.Wimm.
Status: VU D2
Endemism: Endemic
Distribution: Western Cape

Lobelia limosa (Adamson) F.Wimmer
Status: VU B1B2cd2
Endemism: Endemic
Threats: Urban expansion
Distribution: Western Cape

Lobelia nuxa F.Wimmer
Status: VU D2
Endemism: Endemic
Distribution: Western Cape
Apparently very localised and presumably rare.

Lobelia sp. (incl. *L. euryoda* F.Wimmer var. *fissuratum* F.Wimmer)
Status: VU D2
Endemism: Endemic
Distribution: Western Cape
Known from only two collections.

Lobelia stricklandiae Gilliland
Status: VU D2
Distribution: Mpumalanga
This species occurs widely in countries to the north. A recent search of the area failed to reveal any plants of

this large conspicuous species. It is possible that its record was an error.

Lobelia trullifolia subsp. *delicatula* (Compton) Thulin
Status: VU D2
Endemism: Endemic
Distribution: Mpumalanga

Lobelia valida L.Bolus
Status: VU D2
Endemism: Endemic
Distribution: Western Cape

Lobelia zwartkopensis F.Wimmer
Status: CR B1B2abc
Endemism: Endemic
Threats: Urban expansion
Distribution: Eastern Cape
A search in late 2000 failed to reveal any plants.

Monopsis varifolia Urb.
Status: VU B1B2cd2
Endemism: Endemic
Distribution: Western Cape
Very few recent collections have been made, much of its habitat is severely degraded or destroyed.

Wimmerella longitubus (F.Wimmer) L.Serra, M.B.Crespo & Lammers
Laurentia longitubus F.Wimmer
Status: VU D2
Endemism: Endemic
Distribution: Western Cape
The most recent collection was in 1938.

ORCHIDACEAE

Angraecum stella-africae P.J.Cribb
Status: VU D2
Distribution: Limpopo Province

Bonatea lamprophylla J.Stewart
Status: VU B1B2cd2
Endemism: Endemic
Distribution: KwaZulu-Natal

Bonatea saundersiae (Harv.) Dur. & Schinz
Status: VU B1B2c
Endemism: Endemic
Threats: Habitat degradation, deforestation, agriculture
Distribution: KwaZulu-Natal, Limpopo Province

Corycium microglossum Lindl.
Status: EN A1c
Endemism: Endemic
Distribution: Western Cape

Diaphanthe millarii (Bolus) H.P.Linder
Status: EN B1B2abc
Endemism: Endemic
Threats: Alien plant infestation, collection
Distribution: Eastern Cape, KwaZulu-Natal
Heavily exploited by orchid collectors.

Didymoplexis verrucosa Stewart & Hennesy
Status: VU B1B2cd2
Endemism: Endemic
Threats: Habitat degradation
Distribution: KwaZulu-Natal

Disa amoena H.P.Linder
Status: VU D2
Endemism: Endemic
Threats: Afforestation
Distribution: Mpumalanga

Disa arida Vlok
Status: VU D2
Endemism: Endemic
Distribution: Western Cape

Disa barbata (L.f.) Sw.
Herschelianthe barbata-(L.f.) N.C.Anthony
Status: VU D2
Endemism: Endemic
Threats: Alien plant infestation
Distribution: Western Cape

Disa brevipetala H.P.Linder
Status: EX
Endemism: Endemic
Distribution: Western Cape
Only collected twice in 1942; possibly on abnormality.

Disa cedarbergensis H.P.Linder
Status: VU D2
Endemism: Endemic
Distribution: Western Cape
A single plant seen; possibly on abnormality.

Disa clavicornis H.P.Linder
Status: CR B1B2abc
Endemism: Endemic
Distribution: Mpumalanga
Known from two collections.

Disa cochlearis Johnson & Liltved
Status: VU D2
Endemism: Endemic
Distribution: Western Cape

Disa draconis (L.f.) Sw.
Status: VU B1B2abcd
Endemism: Endemic
Threats: Urban expansion, agriculture
Distribution: Western Cape

Disa ecalcarata (Lewis) H.P.Linder
Manadenia ecalcarata Lewis
Status: EX
Endemism: Endemic
Distribution: Western Cape
Possibly on abnormality.

Disa forcipata Schltr.
Herschelianthe forcipata (Schltr.) Rauschert
Status: EX
Endemism: Endemic
Distribution: ?, possibly Western Cape
Known from a single specimen described in 1897; possibly abnormality.

Disa hallackii Rolfe
Status: CR A1ceB1B2abcd
Endemism: Endemic
Threats: Urban expansion, agriculture, alien plant infestation
Distribution: Western Cape, Eastern Cape
Regarded as one of the most threatened South African orchids.

Disa introrsa Kurzweil, Liltved & H.P.Linder
Status: VU D2
Endemism: Endemic
Distribution: Western Cape
Probably fire dependent (sporadic).

Disa lugens Bolus var. *nigrescens* (H.P.Linder) H.P.Linder
Herschelianthe lugens (Bolus) Rauschert var. *nigrescens* (H.P.Linder) N.C.Anthony
Status: VU D2
Endemism: Endemic
Distribution: Eastern Cape
Only seen once.

Disa macrostachya (Lindl.) Bolus
Manadenia macrostachya Lindl.
Status: VU D2
Endemism: Endemic
Distribution: Northern Cape
About five plants.

Disa maculomarronina* McMurtry*Status:** VU D2

Endemism: Endemic

Threats: Afforestation, habitat degradation

Distribution: KwaZulu-Natal, Mpumalanga

Probably of hybrid origin, the parents being D. hircicornis and D. versicolor. Increasing tourist activity impacts on the species in its habitat.

Disa neglecta* Sond.*Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

Dependent on fire for recruitment.

***Disa newdigatae* L.Bolus**

Herschelianthe newdigatae (L.Bolus) N.C.Anthony

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

May be extinct.

Disa nubigena* H.P.Linder*Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

Possibly on obnormolity.

***Disa physodes* Sw.**

Manadenia physodes (Sw.) Rchb.f.

Status: VU D2

Endemism: Endemic

Threats: Urban expansion, agriculture

Distribution: Western Cape

***Disa procera* H.P.Linder**

Herschelia excelsa (Thunb.) Rolfe nom. illegit.

Status: VU D2

Endemism: Endemic

Distribution: Western Cape

***Disa sabulosa* Bolus**

Manadenia sabulosa (Bolus) Kraenzl.

Status: EN B1B2abdc

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape

Probably fire dependent.

***Disa schlechteriana* Bolus**

Herschelianthe schlechteriana (Bolus) N.C.Anthony

Status: VU D2

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape

Disa sculiyi* Bolus*Status:** CR A1B1B2

Endemism: Endemic

Distribution: Eastern Cape, KwaZulu-Natal

***Disa spathulata* (L.f.) Sw. subsp. *tripartita* (Lindl.) H.P.Linder**

Herschelianthe spathulata (L.f.) Rauschert subsp. *tripartita*

(Lindl.) N.C.Anthony

Status: EN B1B2bc

Endemism: Endemic

Threats: Urban expansion, agriculture

Distribution: Western Cape-Eastern Cape boundary

Disa subtenuicornis* H.P.Linder*Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

Seen once. There were a few plants in the colony, therefore probably not just on obnormolity. Apparently, another subpopulation was later found on a nearby peak.

Disa tenella* (L.f.) Sw. subsp. *tenella**Status:** VU A1c

Endemism: Endemic

Threats: Habitat degradation, alien plant infestation

Distribution: Western Cape

Disperis purpurata* Rchb.f. subsp. *pallescens**Bruyns****Status:** VU D2

Endemism: Endemic

Distribution: Northern Cape

Disperis virginialis* Schltr.*Status:** VU D2

Endemism: Endemic

Threats: Afforestation

Distribution: Limpopo Province

Pine plantations are a serious threat.

Eulophia coddii* A.V.Hall*Status:** EN B1B2abdc

Endemism: Endemic

Threats: Afforestation

Distribution: Gauteng, Limpopo Province

Eulophia leachii* Greatrex ex A.V.Hall*Status:** VU A1c

Threats: Habitat degradation

Distribution: KwaZulu-Natal, Gauteng, Limpopo Province

Habenaria mossii* (G.Will.) J.C.Manning*Status:** EN C1C2a

Endemism: Endemic

Threats: Urban expansion

Distribution: Gauteng

Possibly additional unconfirmed locality in the Eastern Cape.

Habenaria woodii* Schltr.*Status:** EN B1B2abc

Endemism: Endemic

Distribution: KwaZulu-Natal

Holothrix culveri* Bolus*Status:** EX

Endemism: Endemic

Distribution: Mpumalanga

Apparently only once collected in 1905. Possibly on obnormolity.

Holothrix longicornu* Lewis*Status:** EX

Endemism: Endemic

Distribution: Eastern Cape

Collected once in 1938. Probably not just an obnormolity—there are a number of plants from the type locality.

Holothrix majubensis* C.Archer & R.Archer*Status:** VU D2

Endemism: Endemic

Threats: Erosion

Distribution: KwaZulu-Natal

Holothrix micrantha* Schltr.*Status:** EN B1B2abdc

Endemism: Endemic?

Distribution: Gauteng

Apparently, collected only once in 1949 in the vicinity of Inyonga (Zimbabwe). Area now under wattle plantation. High human impact. Type locality decimated. Possibly consider DD status.

Holothrix randii* Rendle*Status:** VU B1B2abcd

Threats: Urban expansion

Distribution: Gauteng, Limpopo Province

Microcoelia obovata* Summerh.*Status:** VU D2

Endemism: Endemic

Distribution: KwaZulu-Natal

Pterygodium connivens* Schelpe*Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

May be a subspecies or variety of Pterygodium cruciferum.

Pterygodium cruciferum* Sond.*Status:** EN A1c

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape

Pterygodium newdigatae* Bolus var. *newdigatae**Status:** VU D2

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape

Known from a single collection.

Satyrium hallackii* Bolus subsp. *hallackii**Status:** EN B1B2bc

Endemism: Endemic

Threats: Urban expansion, agriculture, alien plant infestation

Distribution: Western Cape, Eastern Cape

Satyrium muticum* Lindl.*Status:** EN B1B2abc

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape

A few plants were once found near Garden of Eden; plants in Attoquos Kloof (Oudtshoorn district) still exist.

Satyrium pulchrum* Johnson & Kurzweil*Status:** VU D2

Endemism: Endemic

Threats: Grazing/browsing

Distribution: Western Cape

Known only from the type locality. Stock forming is a threat.

***Satyrium rhodanthum* Schltr.**

Satyrium langicauda Lindl. var. *langicauda* x *neglectum* Schltr.

subsp. *woodii* (Schltr.) A.V.Hall**Status:** EN A1cB1B2abc

Endemism: Endemic

Threats: Urban expansion, habitat degradation

Distribution: KwaZulu-Natal

Threatened by housing developments. Most of the habitat has been transformed.

Schizodium longipetalum* Lindl.*Status:** EN B1B2bc

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape

Vanilla roscheri* Rchb.f.*Status:** EN B1B2abc

Endemism: Endemic

Threats: Urban expansion, agriculture, alien plant infestation, habitat degradation

Distribution: KwaZulu-Natal

Zeuxine africana* Rchb.f.*Status:** VU D2

Threats: Urban expansion

Distribution: KwaZulu-Natal

Scott-Show lists this species as EN B1B2obcdc, but it is not declining now. Housing development is a threat.

ROSACEAE

Cliffortia acocksii* Weim.*Status:** EN B1B2c

Endemism: Endemic

Threats: Agriculture, urban expansion, road network

Distribution: Western Cape

Only collected three times, lost in 1949. May well be extinct as the area has been extensively formed for many years. If it still exists, likely to be threatened by farms, housing and road expansion.

Cliffortia burgersii* E.G.H.Oliv. & Fellingham*Status:** EN C2b

Endemism: Endemic

Threats: Grazing
Distribution: Western Cape

***Cliffortia concinna* Weim.**

Status: VU D2
Endemism: Endemic
Distribution: Western Cape
Only found once in 1953, but in a relatively unexplored area. Species belongs to *C. glauca* complex; delimitation of species within this complex is uncertain.

***Cliffortia confiera* E.G.H.Oliv. & Fellingham**

Status: EN D1
Endemism: Endemic
Distribution: Western Cape
Reported that frequent fires prevent recruitment, as no fruit were noted within five years from last fire.

***Cliffortia curvifolia* Weim.**

Status: CR B1B2abc
Endemism: Endemic
Threats: Agriculture, habitat degradation
Distribution: Western Cape
Only collected twice, one specimen without any further information and the other in 1895. Possibly extinct, but locality description is vague and extensive search of area has not yet been done. The species could easily have been overlooked by previous collectors.

***Cliffortia discolor* Weim.**

Status: VU D2
Endemism: Endemic
Distribution: Western Cape
Only collected once in 1884, but taxonomically very doubtfully distinct from *C. odorata*, a widespread species on Table Mountain.

***Cliffortia ericifolia* L.f.**

Status: EN B1B2c
Endemism: Endemic
Threats: Urban expansion, habitat degradation
Distribution: Western Cape
One certain subpopulation at Kenilworth Race Course, which has not been more fully assessed as yet. Two other subpopulations recorded since 1976 at Bothasig and Philadelphi have not yet been located. The Bothasig locality was probably destroyed by widening of N7 highway.

***Cliffortia geniculata* Weim.**

Status: VU D2
Endemism: Endemic
Threats: Alien plant infestation, fire
Distribution: Western Cape
Species belongs to *C. glauca* complex; delimitation of species within this complex is uncertain.

***Cliffortia hermaphrodita* Weim.**

Status: VU D2
Endemism: Endemic
Threats: Alien plant infestation, fire
Distribution: Western Cape
Only collected once in 1943; surprising that it has not been recollected as it occurs in a widely studied valley.

***Cliffortia hirta* Burm.f.**

Status: EN B1B2bc
Endemism: Endemic
Threats: Fire, habitat degradation
Distribution: Western Cape
Five localities known since 1940. Fraggly Pand and University of Cape Town have been lost. Rondebosch Camman has been assessed. The two subpopulations, if they still exist, at Milnerton and Bakbaai, have not been seen as yet. Being a reseeded, it is particularly vulnerable to unnatural fire regimes.

***Cliffortia lanata* Weim.**

Status: VU D2
Endemism: Endemic
Distribution: Western Cape

***Cliffortia marginata* Eckl. & Zeyh.**

Status: EN B1B2abc

Endemism: Endemic
Threats: Urban expansion, habitat degradation
Distribution: Western Cape
Current distribution has not yet been established, but likely to be very small and fragmented due to habitat in which it is found. Species belongs to *C. glauca* complex; delimitation of species within this complex is uncertain.

***Cliffortia monophylla* Weim.**

Status: VU B1B2bc
Endemism: Endemic
Threats: Agriculture, habitat degradation, alien plant infestation
Distribution: Western Cape
An easily overlooked species, but probably scarce due to habitat destruction.

***Cliffortia subdura* Weim.**

Status: CR B1B2bc
Endemism: Endemic
Threats: Alien plant infestation
Distribution: Western Cape
Requires active alien clearance to survive. Threatened in particular by *Acacia meansii* in riverbank habitat.

RUTACEAE

***Acmadenia alternifolia* Cham.**

Status: VU B1B2bcd
Endemism: Endemic
Threats: Afforestation
Distribution: Western Cape
Subpopulation above Stevens Bank in the Harkerville Forestry area has declined recently (2000) due to disturbance of the headland. Pine plantations confine the distribution to a narrow strip.

***Acmadenia argillophila* I.Williams**

Status: CR D1
Endemism: Endemic
Threats: Mining
Distribution: Western Cape
Subpopulation at Anysberg, but petals white—identification still needs confirmation. Seems to be different variety. Quarrying activities have resulted in near-extirpation.

***Acmadenia candida* I.Williams**

Status: EX
Endemism: Endemic
Distribution: Western Cape
Only known subpopulation that remained was destroyed by forestry in 1968 (Nuweberg Forest Station).

***Acmadenia faucitincta* I.Williams**

Status: VU D2
Endemism: Endemic
Distribution: Western Cape
Collected only once. Areo was searched in 1993, but probably not in the right locality; not found. Inaccessible habitat.

***Acmadenia gracilis* Dummer**

Status: VU D2
Endemism: Endemic
Threats: Agriculture, habitat degradation
Distribution: Western Cape

***Acmadenia kiwanensis* I.Williams**

Status: CR B1B2c
Endemism: Endemic
Threats: Fire
Distribution: Eastern Cape
Rural agriculture (cattle)—grazing and trampling. Not a resprouter.

***Acmadenia latifolia* I.Williams**

Status: VU D2
Endemism: Endemic
Threats: Agriculture
Distribution: Western Cape
Rare and could quickly disappear if land use changes; subpopulations accessible.

***Acmadenia laxa* I.Williams**

Status: VU D2
Endemism: Endemic
Threats: Agriculture
Distribution: Western Cape

***Acmadenia macradenia* (Sond.) Dummer**

Status: VU D2
Endemism: Endemic
Threats: Afforestation
Distribution: Western Cape

***Acmadenia macropetala* (P.E.Glover) Compton**

Status: VU B1B2bcdD2
Endemism: Endemic
Threats: Agriculture, fire
Distribution: Western Cape
Slow sporadic decline, accessible habitats.

***Acmadenia nivea* I.Williams**

Status: VU D2
Endemism: Endemic
Threats: Fire
Distribution: Western Cape
Not a resprouter.

***Acmadenia nivenii* Sond.**

Status: VU D2
Endemism: Endemic
Threats: Agriculture
Distribution: Western Cape

***Acmadenia rupicola* I.Williams**

Status: VU D2
Endemism: Endemic
Threats: Fire, habitat degradation
Distribution: Western Cape
Accessible locality, but protected to a certain degree by growing amongst rocks; may have been more widely distributed in the past.

***Adenandra gracilis* Eckl. & Zeyh.**

Status: VU D2
Endemism: Endemic
Distribution: Western Cape
Safe (high altitude) but restricted. Only one specimen in PRE.

Adenandra odoratissima* Strid subsp. *odoratissima

Status: VU D2
Endemism: Endemic
Threats: Agriculture
Distribution: Western Cape

***Adenandra odoratissima* Strid subsp. *tenuis* Strid**

Status: VU D2
Endemism: Endemic
Threats: Agriculture
Distribution: Western Cape

***Adenandra schlechteri* Dummer**

Status: VU D2
Endemism: Endemic
Distribution: Western Cape

***Agathosma asperifolia* Eckl. & Zeyh.**

Status: VU D2
Endemism: Endemic
Distribution: Western Cape
Very restricted distribution.

***Agathosma canaliculata* P.A.Bean**

Status: VU D2
Endemism: Endemic
Distribution: Western Cape
Habitat specialist.

***Agathosma capitata* Sond.**

Status: EN B1B2c
Endemism: Endemic
Threats: Agriculture
Distribution: Western Cape
Very restricted.

Agathasma cephalodes* E.Mey. ex Sond.*Status:** CR B1B2abc

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape

*Possibly already extinct? Reported to be affected by the raaiabas tea industry.****Agathasma citriodora* P.A.Bean****Status:** VU D2

Endemism: Endemic

Distribution: Eastern Cape

*Habitat specialist.****Agathasma collina* Eckl. & Zeyh.****Status:** VU B1B2c

Endemism: Endemic

Threats: Urban expansion

Distribution: Western Cape

*Restricted to coastal dunes. Threatened by housing development.****Agathasma conferta* Pillans****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Habitat specialist.****Agathasma carymbasa* (Montin) G.Don****Status:** VU B1B2abcde

Endemism: Endemic

Threats: Urban expansion, agriculture

Distribution: Western Cape

*Possibly already endangered.****Agathasma decurrens* Pillans****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Restricted to one mountain.****Agathasma dentata* Pillans****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Habitat specialist.****Agathasma digitata* P.A.Bean****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Habitat specialist.****Agathasma distans* Pillans****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Very restricted distribution.****Agathasma dregeana* Sond.****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Not under threat from human impact.****Agathasma elata* Sond.****Status:** EN B1B2bc

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape

*Very restricted distribution.****Agathasma eriantha* (Steud.) Steud.****Status:** VU B1B2c

Endemism: Endemic

Threats: Agriculture, grazing/browsing

Distribution: Western Cape

*Limestone specialist. Affected by trampling.****Agathasma geniculata* Pillans****Status:** VU B1B2c

Endemism: Endemic

Threats: Urban expansion

Distribution: Western Cape

*Limestone in fixed coastal dunes.****Agathasma glabrata* Bartl. & Wendl.****Status:** VU B1B2bcd

Endemism: Endemic

Threats: Urban expansion, agriculture

Distribution: Western Cape

*Possibly already endangered.****Agathasma glandulosa* (Thunb.) Sond.****Status:** VU B1B2c

Endemism: Endemic

Threats: Agriculture, grazing

Distribution: Western Cape

*Susceptible to further human impact. Affected by trampling.****Agathasma gnidiiflora* Dummer****Status:** EX?

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape

*Collected only once, agricultural area, probably extinct.****Agathasma hispida* (Thunb.) Bartl. & Wendl.****Status:** EN B1B2c

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape

*Restricted distribution.****Agathasma involocrata* Eckl. & Zeyh.****Status:** VU D2

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape

*Habitat specialist.****Agathasma lancifolia* Eckl. & Zeyh.****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Habitat specialist.****Agathasma maculata* P.A.Bean****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Habitat specialist.****Agathasma marifolia* Eckl. & Zeyh.****Status:** VU D2

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape

*Very restricted distribution.****Agathasma minuta* Schlttdl.****Status:** EN B1B2bc

Endemism: Endemic

Distribution: Western Cape

*Isolated subpopulations.****Agathasma muirii* E.Phillips****Status:** VU B1B2c

Endemism: Endemic

Threats: Urban expansion

Distribution: Western Cape

Agathasma orbicularis* (Thunb.) Bartl. & H.L.Wendl.*Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

Agathasma pallens* Pillans*Status:** EN B1B2bc

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape

*Very restricted distribution.****Agathasma parvpetala* P.A.Bean****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Very restricted distribution.****Agathasma pattisanae* Dummer****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Very restricted distribution.****Agathasma phillipsii* Dummer****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Isolated to one mountain.****Agathasma prapinqua* Sond.****Status:** VU B1B2c

Endemism: Endemic

Threats: Agriculture, habitat degradation

Distribution: Western Cape

*Isolated subpopulations.****Agathasma pulchella* (L.) Link****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

Agathasma robusta* Eckl. & Zeyh.*Status:** EN B1B2c

Endemism: Endemic

Threats: Urban expansion

Distribution: Western Cape

*Habitat specialist.****Agathasma rotundifolia* P.A.Bean****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

*Habitat specialist.****Agathasma rubricaulis* Dummer****Status:** VU D2

Endemism: Endemic

Threats: Fire

Distribution: Western Cape

Agathasma salina* Eckl. & Zeyh.*Status:** EN B1B2c

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape

*Habitat specialist; possibly endangered.****Agathasma sedifolia* Schlttdl.****Status:** EN B1B2c

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape

*Limestone endemic.****Agathasma spinosa* Sond.****Status:** VU D2

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape

*Accessible since it grows on lower slopes.****Agathasma stenopetala* (Steud.) Steud.****Status:** VU B1B2c

Endemism: Endemic

Threats: Urban expansion

Distribution: Eastern Cape

*Susceptible to further human impact.****Agathasma subterretifolia* Pillans****Status:** VU D2

Endemism: Endemic

Distribution: Western Cape

Very restricted distribution.

Agathosma thymifolia Schldl.
Status: VU B1B2c
 Endemism: Endemic
 Threats: Agriculture, habitat degradation
 Distribution: Western Cape
Habitat specialist.

Agathosma trichocarpa Holmes
Status: VU D2
 Endemism: Endemic
 Distribution: Western Cape
Only found once.

Agathosma umbonata Pillans
Status: VU D2
 Endemism: Endemic
 Distribution: Western Cape
Habitat specialist.

Agathosma viviersii P.A.Bean
Status: VU D2
 Endemism: Endemic
 Threats: Habitat degradation
 Distribution: Western Cape
Habitat specialist.

Agathosma williamsii P.A.Bean
Status: VU D2
 Endemism: Endemic
 Distribution: Western Cape
Very restricted distribution.

Agathosma zwartbergense Pillans
Status: VU D2
 Endemism: Endemic
 Distribution: Western Cape
Restricted to small part of Swartberg Mountains.

Coleonema virgatum (Schldl.) Eckl. & Zeyh.
Status: VU D2
 Endemism: Endemic
 Distribution: Western Cape

Diosma aristata I.Williams
Status: CR A1aceB1B2abceC2b
 Endemism: Endemic
 Threats: Alien plant infestation
 Distribution: Western Cape
If it still exists, it will be extinct very soon.

Diosma fallax I.Williams
Status: VU D2
 Endemism: Endemic
 Distribution: Western Cape
Was listed as extinct but was collected in 1994.

Diosma haelkraalsensis I.Williams
Status: VU D2
 Endemism: Endemic
 Distribution: Western Cape

Diosma parvula I.Williams
Status: EN B1B2abcde
 Endemism: Endemic
 Threats: Alien plant infestation
 Distribution: Western Cape
Driefontein locality overrun with wattles and is degraded.

Diosma passerinoides Steud.
Status: VU B1B2bcd
 Endemism: Endemic
 Threats: Agriculture
 Distribution: Western Cape, Eastern Cape

Diosma strumosa I.Williams
Status: VU D2
 Endemism: Endemic
 Distribution: Western Cape
Possibly more widespread.

Diosma thyrsophora Eckl. & Zeyh.
Status: VU D2
 Endemism: Endemic

Distribution: Western Cape
Safe.

Euchaetis avisylvana I.Williams
Status: VU A1aceD2
 Endemism: Endemic
 Threats: Road network, fire, afforestation
 Distribution: Western Cape
Not a resprouter. Affected by pine plantations.

Euchaetis diosmoides (Schltr.) I.Williams
Status: VU D2
 Endemism: Endemic
 Threats: Alien plant infestation, agriculture
 Distribution: Western Cape

Euchaetis intonsa I.Williams
Status: VU D2
 Endemism: Endemic
 Distribution: Western Cape

Euchaetis longicornis I.Williams
Status: VU D2
 Endemism: Endemic
 Distribution: Western Cape

Macrostylis barbiger (L.f.) Bartl. & H.L.Wendl.
Status: VU D2
 Endemism: Endemic
 Distribution: Western Cape

Macrostylis cassiopoides (Turcz.) I.Williams
 subsp. *cassiopoides*
Status: VU D2
 Endemism: Endemic
 Distribution: Western Cape

Macrostylis cassiopoides (Turcz.) I.Williams
 subsp. *dregeana* (Sond.) I.Williams
Status: EN B1B2abcd
 Endemism: Endemic
 Threats: Urban expansion, agriculture
 Distribution: Western Cape
Extinct in large part of its range now.

Macrostylis hirta E.Mey. ex Sond.
Status: VU D2
 Endemism: Endemic
 Distribution: Western Cape

Macrostylis ramulosa I.Williams
Status: VU D2
 Endemism: Endemic
 Distribution: Western Cape

Macrostylis villosa (Thunb.) Sond. subsp. *minor*
 I.Williams
Status: EX
 Endemism: Endemic
 Distribution: Western Cape
Type locality now under intensive cultivation, searches failed to rediscover this plant.

Sheilanthera pubens I.Williams
Status: VU D2
 Endemism: Endemic
 Distribution: Western Cape
Safe, surrounded by agricultural practices, but probably inaccessible.

SOLANACEAE

Solanum litoraneum A.E.Gonc.
Status: VU B1B2c
 Distribution: KwaZulu-Natal. Also known from Mozambique.

THYMELAEACEAE

Lachnaea aurea Meisn.
Status: VU B1B2c
 Endemism: Endemic

Threats: Agriculture, alien plant infestation
 Distribution: Western Cape

Lachnaea axillaris Meisn.
Status: VU A1ce
 Endemism: Endemic
 Threats: Alien plant infestation, habitat degradation
 Distribution: Western Cape

Lachnaea capitata (L.) Crantz
Status: VU A1c
 Endemism: Endemic
 Threats: Urban expansion
 Distribution: Western Cape

Lachnaea densiflora Meisn.
Status: VU A1c
 Endemism: Endemic
 Threats: Urban expansion
 Distribution: Western Cape

Lachnaea filicaulis (Meisn.) Beyers
Status: VU A1ce
 Endemism: Endemic
 Threats: Habitat degradation, alien plant infestation
 Distribution: Western Cape

Lachnaea grandiflora (L.f.) Baill.
Status: VU A1c
 Endemism: Endemic
 Threats: Urban expansion, alien plant infestation
 Distribution: Western Cape

Lachnaea greytonensis Beyers ined.
Status: VU D2
 Endemism: Endemic
 Threats: Fire
 Distribution: Western Cape
Restricted, localised distribution. Being a reseeder, it is vulnerable to frequent mountain fires.

Lachnaea leipoldtii Beyers ined.
Status: VU D2
 Endemism: Endemic
 Threats: Fire
 Distribution: Western Cape
Restricted distribution. Being a reseeder, it is vulnerable to frequent mountain fires.

Lachnaea oliverorum Beyers ined.
Status: VU D2
 Endemism: Endemic
 Threats: Fire
 Distribution: Western Cape
A localised species with a restricted distribution. Being a reseeder, it is vulnerable to frequent mountain fires.

Lachnaea stokoei Beyers ined.
Status: EX
 Endemism: Endemic
 Distribution: Western Cape
This species is known from only two collections. More than 40 years have elapsed since the last collection. This portion of the Langeberg has been fairly well surveyed and specific searches for this species have been unsuccessful (1993).

Lachnaea uniflora (L.) Crantz
Status: VU A1c
 Endemism: Endemic
 Threats: Urban expansion, habitat degradation
 Distribution: Western Cape
Most of the subpopulations on sandy flats north of Cape Peninsula and on the Cape Peninsula in vicinity of Wynberg and Constantia have disappeared.

Passerina burchellii Thoday
Status: VU D2
 Endemism: Endemic
 Threats: Fire
 Distribution: Western Cape
Mountain tops, misty southwest facing rocky outcrops.

Passerina paludosa Thoday

Status: VU B1B2abcd

Endemism: Endemic

Threats: Urban expansion, alien plant infestation

Distribution: Western Cape

Recorded from the Cape Flats, Simonstown and elsewhere. Large subpopulation between Randevelei Nature Reserve and Zeekoeivlei. Other subpopulations have been propagated from cuttings.

Struthiola anomala Hilliard

Status: VU D2

Endemism: Endemic

Distribution: KwaZulu-Natal



Astridia citrina, a rare endemic from KwaZulu-Natal and Eastern Cape (Hilton-Taylor, 1996a). (Photo: NBI)



Aloe pillansii, a conservation flagship, is found in the Northern Cape and extends into Namibia. (Photo: NBI)



Encephalartos brevifoliolatus is a highly threatened cycad that is endemic to South Africa. (Photo: NBI)

LOWER RISK

AIZOACEAE

Conophytum armianum S.A.Hammer

Status: LR-nt

Endemism: Endemic

Threats: Mining, grazing

Distribution: Northern Cape

Northern subpopulations fragmented and small, consisting mainly of seedlings or badly stunted plants; southern plants (morphologically different) large healthy subpopulations. Possibly collected in the past.

Conophytum auriflorum Tischer subsp. *auriflorum*

Status: LR-nt

Endemism: Endemic

Distribution: Northern Cape

Koringhuis plants are smaller, darker red-skinned, much more reluctant to flower in cultivation, but some ecology.

Conophytum bicarinatum L.Bolus

Status: LR-nt

Endemism: Endemic

Distribution: Western Cape

The two disjunct subpopulations are morphologically different.

Conophytum blandum L.Bolus

Status: LR-nt

Endemism: Endemic

Threats: Grazing

Distribution: Northern Cape

Mining and habitat degradation may pose future threats.

Conophytum carpianum L.Bolus

Status: LR-nt

Endemism: Endemic

Distribution: Northern Cape

Thriving at present.

Conophytum concavum L.Bolus

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape

Common within the distribution area.

Conophytum ernstii S.A.Hammer subsp. *ernstii*

Status: LR-nt

Endemism: Endemic

Distribution: Northern Cape

Conophytum frutescens Schwantes

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape

One subpopulation lacks two of *C. frutescens*'s prime traits: red petals and spring flowering.

Conophytum khamiesbergense (L.Bolus)

Schwantes

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape

Conophytum lithopsoides L.Bolus subsp.

lithopsoides

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape

Conophytum loeschianum Tischer

Status: LR-lc

Distribution: Northern Cape

Conophytum praesectum N.E.Br.

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape

Conophytum regale Lavis

Status: LR-nt

Endemism: Endemic

Distribution: Northern Cape

Easy to grow and well-established in horticulture.

Conophytum rugosum S.A.Hammer subsp. *rugosum*

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape, Northern Cape

Conophytum swanepoelianum Rawe subsp.

swanepoelianum

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Conophytum velutinum Schwantes subsp.

velutinum

Status: LR-nt

Endemism: Endemic

Distribution: Northern Cape

Conophytum verrucosum (Lavis) G.D.Rowley

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape

One subpopulation is placed under this species but shouldn't be—it is possibly *C. friedrichiae*.

ALOACEAE

Aloe affinis A.Berger

Status: LR-lc

Endemism: Endemic

Threats: Afforestation

Distribution: Mpumalanga

Quite widely distributed but under threat from commercial forestry.

Aloe arenicola Reynolds

Status: LR-lc

Endemism: Endemic

Threats: Mining, grazing, collection

Distribution: Western Cape, Northern Cape

Widespread along dunes of the West Coast. Threatened by mining and grazing. Known to be illegally collected.

Aloe falcata Baker

Status: LR-nt

Endemism: Endemic

Distribution: Western Cape, Northern Cape

Aloe haemanthifolia Marl. & A.Berger

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Aloe krapohlana Marloth

Status: LR-nt

Endemism: Endemic

Threats: Collection, agriculture, grazing

Distribution: Northern Cape, Western Cape

Known to be illegally collected.

Aloe vryheidensis Groenewald

Status: LR-lc

Endemism: Endemic

Distribution: Mpumalanga, Limpopo Province, North-West, KwaZulu-Natal

Was threatened until placed into synonymy with *A. dolomitica*.

AMARYLLIDACEAE

Apodolirion lanceolatum Baker

Status: LR-nt

Endemism: Endemic

Threats: Browsing

Distribution: Western Cape

Flowers are eaten by wild animals.

Brunsvigia pulchra (W.F.Barker) D. & U.Mull.-Doblies

Status: LR-lc

Endemism: Endemic

Threats: Grazing/browsing

Distribution: Northern Cape

Trampling by goats is a threat.

Brunsvigia striata (Jacq.) Aiton

Brunsvigia minor Lindl.

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape, Western Cape, Eastern Cape

Cape

Brunsvigia undulata Leight.

Status: LR-lc

Endemism: Endemic

Distribution: KwaZulu-Natal

Clivia caulescens R.A.Dyer

Status: LR-lc

Endemism: Endemic

Distribution: Eastern Cape

Clivia gardenii Hook.

Status: LR-lc

Endemism: Endemic

Distribution: KwaZulu-Natal

Clivia miniata (Lindl.) Regel

Status: LR-lc

Distribution: Eastern Cape, KwaZulu-Natal

Clivia nobilis Lindl.

Status: LR-lc

Endemism: Endemic

Distribution: KwaZulu-Natal, Eastern Cape

Crinum acaule Baker

Status: LR-lc

Endemism: Endemic

Distribution: KwaZulu-Natal

Crinum campanulatum Herb.

Status: LR-lc

Endemism: Endemic

Threats: Salinisation?

Distribution: Eastern Cape

Change in water quality through pollution is a threat.

Crinum variable (Jacq.) Herb.

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape, Western Cape

No longer considered to be a rare species.

Cyrtanthus bicolor R.A.Dyer

Status: LR-lc

Distribution: Mpumalanga

Cyrtanthus brachyscyphus Baker

Cyrtanthus rectiflorus Baker

Status: LR-lc

Endemism: Endemic

Distribution: Eastern Cape, KwaZulu-Natal

C. rectiflorus Bok. is known only from the type specimen at K ("Perie"). Considered to be a synonym of *C. brachyscyphus* Baker, a widespread species.

Cyrtanthus collinus* Ker Gawl.Cyrtanthus stoddensis* Schonland**Status:** LR-lc

Endemism: Endemic

Distribution: Eastern Cape

Considered to be a local form of the widespread C. collinus Ker Gawl.***Cyrtanthus helictus* Lehm.****Status:** LR-lc

Endemism: Endemic

Threats: Grazing

Distribution: Eastern Cape

Cyrtanthus herrei* (Leight.) R.A.Dyer*Status:** LR-nt

Threats: Collection

Distribution: Northern Cape

*Known to be illegally collected.****Cyrtanthus leucanthus* Schltr.****Status:** LR-lc

Endemism: Endemic

Threats: Urban expansion, habitat degradation

Distribution: Western Cape

*Depends on fire to flower. Coastal development is a threat.****Cyrtanthus loddigesianus* (Herb.) R.A.Dyer****Status:** LR-lc

Endemism: Endemic

Threats: Urban expansion, habitat degradation

Distribution: Eastern Cape

*Grows between coastal houses if not mown. Coastal development is a threat.****Cyrtanthus smithiae* Watt. ex Harv.****Status:** LR-nt

Endemism: Endemic

Threats: Collection, grazing

Distribution: Eastern Cape

*Known to be illegally collected.****Cyrtanthus epiphyticus* J.M.Wood****Status:** LR-lc

Distribution: Eastern Cape, KwaZulu-Natal, former

Transvaal

Gethyllis ciliaris* (Thunb.) Thunb. subsp. *ciliaris**Status:** LR-lc

Endemism: Endemic

Threats: Urban expansion, habitat degradation

Distribution: Western Cape

*Herbarium records incomplete. Coastal development is a threat.****Gethyllis multifolia* L.Bolus***Gethyllis campanulata* L.Bolus**Status:** LR-lc

Endemism: Endemic

Threats: Collection, grazing

Distribution: Northern Cape, Western Cape

G. campanulata regarded as the northern form of this species. *Known to be illegally collected. Sheep forming activity is a threat.****Haemanthus amarylloides* Jacq. subsp.*****amarylloides*****Status:** LR-nt

Endemism: Endemic

Threats: Urban expansion, agriculture, alien plant infestation

Distribution: Northern Cape, Western Cape

*Housing development is a threat.****Haemanthus dasyphyllus* Snijman****Status:** LR-lc

Endemism: Endemic

Threats: Collection

Distribution: Northern Cape

*Known to be illegally collected.****Haemanthus lanceifolius* Jacq.****Status:** LR-nt

Endemism: Endemic

Threats: Collection, grazing/browsing

Distribution: Western Cape

*Known to be illegally collected. Trompling activity is a threat.****Haemanthus paucifolius* Snijman & A.E.van Wyk****Status:** LR-lc

Threats: Grazing/browsing

Distribution: Mpumalanga

*Infrequent trompling activity is a threat.****Haemanthus pubescens* L.f. subsp. *arenicola******Snijman*****Status:** LR-lc

Threats: Mining

Distribution: Northern Cape

Haemanthus tristis* Snijman*Status:** LR-lc

Endemism: Endemic

Distribution: Western Cape

Hesseea incana* Snijman*Status:** LR-nt

Endemism: Endemic

Threats: Grazing/browsing

Distribution: Northern Cape

*Grazing/browsing by domesticated animals is a threat.****Hesseea pilosa* D. & U.Mull.-Doblies****Status:** LR-lc

Endemism: Endemic

Threats: Grazing/browsing

Distribution: Northern Cape

*Trompling by domestic stock is a threat.****Hesseea pulcherrima* D. & U.Mull.-Doblies****Status:** LR-lc

Endemism: Endemic

Distribution: Northern Cape

Hesseea stenosphon* (Snijman) D. & U.Mull.-Doblies*Status:** LR-lc

Endemism: Endemic

Distribution: Northern Cape

Nerine bowdenii* Watson*Status:** LR-lc

Endemism: Endemic

Distribution: KwaZulu-Natal, Eastern Cape

Nerine humilis* (Jacq.) Herb.*Status:** LR-lc

Endemism: Endemic

Distribution: Western Cape, Eastern Cape

Nerine pancratioides* BakerNerine platypetala* McNeil**Status:** LR-lc

Endemism: Endemic

Distribution: KwaZulu-Natal, Mpumalanga, Eastern

Cape

Nerine pudica* Hook.F.*Status:** LR-nt

Endemism: Endemic

Distribution: Western Cape

Strumaria barbarae* Oberm.*Status:** LR-lc

Threats: Grazing/browsing

Distribution: Northern Cape

*Goots are a problem.****Strumaria bidentata* Schinz****Status:** LR-nt

Threats: Agriculture, grazing/browsing, mining

Distribution: Northern Cape

*Goots are a problem.****Strumaria discifera* Marloth ex Snijman subsp.*****bulbifera* Snijman****Status:** LR-lc

Endemism: Endemic

Distribution: Northern Cape

Strumaria karooica* (W.F.Barker) Snijman*Status:** LR-lc

Endemism: Endemic

Distribution: Northern Cape

Strumaria karooopoortensis* (D. & U.Mull.-Doblies)**Snijman*****Status:** LR-nt

Endemism: Endemic

Distribution: Western Cape

Strumaria massoniella* (D. & U.Mull.-Doblies)**Snijman*****Status:** LR-lc

Endemism: Endemic

Distribution: Northern Cape

Strumaria merxmulleriana* (D. & U.Mull.-Doblies)**Snijman*****Status:** LR-lc

Endemism: Endemic

Distribution: Northern Cape

Strumaria picta* W.F.Barker*Status:** LR-lc

Endemism: Endemic

Distribution: Northern Cape

Strumaria pubescens* W.F.Barker*Status:** LR-lc

Endemism: Endemic

Distribution: Northern Cape

Strumaria pygmaea* Snijman*Status:** LR-lc

Endemism: Endemic

Distribution: Northern Cape, Western Cape

Strumaria salteri* W.F.Barker*Status:** LR-lc

Endemism: Endemic

Threats: Collection, agriculture

Distribution: Western Cape

*This species has extremely attractive flowers. Known to be illegally collected by bulb enthusiasts.****Strumaria spiralis* (L'Herit.) Aiton***Carpolyza spiralis* (L'Herit.) Salisb.**Status:** LR-lc

Endemism: Endemic

Distribution: Northern Cape

Strumaria villosa* Snijman*Status:** LR-lc

Endemism: Endemic

Distribution: Northern Cape

Strumaria watermeyeri* L.Bolus subsp.**botterkloofensis* (D. & U.Mull.-Doblies) Snijman****Status:** LR-lc

Endemism: Endemic

Distribution: Northern Cape

Strumaria watermeyeri* L.Bolus subsp.**watermeyeri*****Status:** LR-lc

Endemism: Endemic

Distribution: Northern Cape

APOCYNACEAE

Brachystelma australe* R.A.Dyer*Status:** LR-lc

Endemism: Endemic

Distribution: KwaZulu-Natal, Eastern Cape

Very similar to B. modestum.

Brachystelma cathcartense* R.A.Dyer*Status:** LR-nt

Endemism: Endemic

Distribution: Eastern Cape

*Sheep farming (extensive).****Brachystelma delicatum* R.A.Dyer****Status:** LR-nt

Endemism: Endemic

Threats: Agriculture

Distribution: Eastern Cape

*Grows with B. campanulatum. Cultivation of pineapples and other crops threatens this species. However, found in rocky areas where it is safe.****Brachystelma dimorphum* R.A.Dyer subsp.****dimorphum****Status:** LR-1c

Endemism: Endemic

Distribution: North-West

Brachystelma gemmeum* R.A.Dyer*Status:** LR-1c

Endemism: Endemic

Distribution: Mpumalanga, Limpopo Province

Brachystelma glenense* R.A.Dyer*Status:** LR-nt

Endemism: Endemic

Threats: Agriculture

Distribution: Free State, North-West

*Nutrient-rich clay soils ideal for wheat crops. Farming of wheat is a threat.****Brachystelma incanum* R.A.Dyer****Status:** LR-1c

Endemism: Endemic

Threats: Collection

Distribution: North-West

Brachystelma inconspicuum* S.Venter*Status:** LR-1c

Endemism: Endemic

Distribution: Limpopo Province

Brachystelma longifolium* (Schltr.) N.E.Br.*Status:** LR-1c

Endemism: Endemic

Distribution: Mpumalanga

*Rare but not threatened.****Brachystelma minimum* R.A.Dyer****Status:** LR-1c

Endemism: Endemic

Distribution: Eastern Cape

*Non-arable habitat ensures safety from farming activities.****Brachystelma minor* E.A.Bruce****Status:** LR-1c

Endemism: Endemic

Distribution: Limpopo Province

*Non-arable habitat ensures safety from farming activities.****Brachystelma parvulum* R.A.Dyer****Status:** LR-nt

Endemism: Endemic

Distribution: Mpumalanga

Brachystelma perditum* R.A.Dyer*Status:** LR-1c

Distribution: KwaZulu-Natal, Free State

Brachystelma petraeum* R.A.Dyer*Status:** LR-nt

Endemism: Endemic

Threats: Afforestation

Distribution: KwaZulu-Natal

Brachystelma pilosum* R.A.DyerBrachystelma hirtellum* Weim.**Status:** LR-nt

Endemism: Endemic

Threats: Agriculture

Distribution: Limpopo Province

*Not threatened due to past decline. Habitat transformed through tobacco and peanut farming.****Brachystelma tenellum* R.A.Dyer****Status:** LR-nt

Endemism: Endemic

Distribution: KwaZulu-Natal

*Not threatened due to small area.****Ceropegia cancellata* Rchb.****Status:** LR-1c

Endemism: Endemic

Distribution: Eastern Cape

Ceropegia fimbriata* E.Mey. subsp. *fimbriata**Status:** LR-1c

Endemism: Endemic

Distribution: Eastern Cape

*Very closely related to C. cannivens–C. geniculata–C. zeyheri group.****Ceropegia mafekingensis* (N.E.Br.) R.A.Dyer****Status:** LR-1c

Distribution: Gauteng, North-West

*Widespread, but rare in locality. More like Brachystelma than Ceropegia.****Ceropegia radicans* Schltr. subsp. *radicans*****(M.R.Henderson) R.A.Dyer****Status:** LR-nt

Endemism: Endemic

Distribution: Eastern Cape

Ceropegia scabriflora* N.E.Br.*Status:** LR-1c

Endemism: Endemic

Distribution: KwaZulu-Natal

*Rare, but not threatened.****Ceropegia stentiae* E.A.Bruce****Status:** LR-1c

Endemism: Endemic

Distribution: North-West, Limpopo Province

Ceropegia turricula* E.A.Bruce*Status:** LR-nt

Endemism: Endemic

Distribution: Limpopo Province, Mpumalanga, Gauteng

ASTERACEAE

Adenoglossa decurrens* (Hutch.) B.Nord.*Status:** LR-1c

Endemism: Endemic

Distribution: Northern Cape

*Annual herb that seems to grow only in favourable years.****Anaxeton brevipes* Lundgren****Status:** LR-1c

Endemism: Endemic

Distribution: Western Cape

*Grows on rocky slopes.****Anaxeton ellipticum* Lundgren****Status:** LR-1c

Endemism: Endemic

Distribution: Western Cape

*Usually grows on rocky slopes.****Anaxeton hirsutum* (Thunb.) Less.****Status:** LR-1c

Endemism: Endemic

Distribution: Western Cape

*Grows on mountain slopes.****Anaxeton virgatum* DC.****Status:** LR-1c

Endemism: Endemic

Distribution: Western Cape

*Rare; usually grows on southern slopes.****Antithrixia flavicoma* DC.****Status:** LR-1c

Endemism: Endemic

Distribution: Northern Cape

Arctotis bolusii* (S.Moore) Lewin*Status:** LR-1c

Endemism: Endemic

Distribution: Free State?, Northern Cape

Arctotis sulcocarpa* Lewin*Status:** LR-1c

Endemism: Endemic

Distribution: Western Cape

*Arctotis needs revision urgently.****Athanasia crithmifolia* (L.) L. subsp. *palmatifida*****(DC.) Källersjö****Status:** LR-1c

Endemism: Endemic

Distribution: Western Cape

*Generally in wet areas at altitudes above 600 m on mountain sides.****Athanasia grandiceps* Hilliard & B.L.Burtt****Status:** LR-1c

Endemism: Endemic

Distribution: KwaZulu-Natal

*Grows in rough grass and shrub communities.****Athanasia hirsuta* Thunb.****Status:** LR-1c

Endemism: Endemic

Distribution: Western Cape

Athanasia ocephala* (DC.) Källersjö*Status:** LR-1c

Endemism: Endemic

Distribution: Western Cape

*Grows on dry, grassy, lower slopes.****Athanasia scabra* Thunb.****Status:** LR-1c

Endemism: Endemic

Distribution: Western Cape

Eriocephalus tenuipes* C.A.Sm.*Status:** LR-1c

Endemism: Endemic

Distribution: Eastern Cape

Euryops brevilibos* Compton*Status:** LR-1c

Endemism: Endemic

Threats: Fire

Distribution: Western Cape

Euryops marlothii* B.Nord.*Status:** LR-1c

Endemism: Endemic

Distribution: Northern Cape

*Local but dominant in patches in karraid low scrub.****Euryops polytrichoides* (Harv.) B.Nord.****Status:** LR-1c

Endemism: Endemic

Distribution: Eastern Cape

*Restricted distribution.****Felicia canaliculata* Grau****Status:** LR-1c

Endemism: Endemic

Distribution: Western Cape

Helichrysum amplexens* Hilliard*Status:** LR-1c

Endemism: Endemic

Distribution: KwaZulu-Natal

Helichrysum cochleariforme* DC.*Status:** LR-1c

Endemism: Endemic

Distribution: Western Cape

Helichrysum ephelos* Hilliard*Status: LR-lc**

Endemism: Endemic

Distribution: KwaZulu-Natal, Eastern Cape

*Forms large mats on damp earth banks and tussocks of the marshy sources of streams.****Helichrysum incarnatum* DC.****Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

*Inconspicuous plant. Undercollected, but common.****Helichrysum isolepis* Bolus****Status: LR-nt**

Endemism: Endemic

Distribution: Eastern Cape

Helichrysum jubilatatum* Hilliard*Status: LR-lc**

Endemism: Endemic

Distribution: Northern Cape

Helichrysum longinquum* Hilliard*Status: LR-lc**

Endemism: Endemic

Distribution: KwaZulu-Natal

Helichrysum mariescopicum* Hilliard*Status: LR-lc**

Endemism: Endemic

Distribution: Mpumalanga

Helichrysum micropoides* DC.*Status: LR-lc**

Distribution: Northern Cape, Western Cape

Helichrysum milleri* Hilliard*Status: LR-lc**

Distribution: Mpumalanga

Helichrysum palustre* Hilliard*Status: LR-lc**

Distribution: KwaZulu-Natal, Eastern Cape

Helichrysum pulchellum* DC.*Status: LR-lc**

Endemism: Endemic

Distribution: Northern Cape, Western Cape

Helichrysum rutilans* (L.) D.Don.*Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape, Eastern Cape, Northern Cape, Free State

Helichrysum saxicola* Hilliard*Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

Helichrysum sessile* DC.*Status: LR-lc**

Endemism: Endemic

Helichrysum simulans* Harv. & Sond.*Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

*Inconspicuous plant. Undercollected, but common.****Helichrysum tricoatum* (Thunb.) Less.****Status: LR-lc**

Endemism: Endemic

Distribution: Northern Cape, Western Cape

Helichrysum woodii* N.E.Br.*Status: LR-nt**

Endemism: Endemic

Threats: Alien plant infestation, habitat degradation
Distribution: KwaZulu-Natal***Inula paniculata* (Klatt) Burt Davy****Status: LR-lc**

Endemism: Endemic

Distribution: Limpopo Province, Mpumalanga

Lasiopogon ponticulus* Hilliard*Status: LR-lc**

Distribution: Northern Cape

*Grows in sand.****Macowanina corymbosa* M.D.Henderson****Status: LR-lc**

Endemism: Endemic

Distribution: KwaZulu-Natal

Osteospermum armatum* Norl.*Status: LR-lc**

Endemism: Endemic

Distribution: Northern Cape

Osteospermum attenuatum* Hilliard & B.L.Burt*Status: LR-lc**

Endemism: Endemic

Distribution: KwaZulu-Natal

Othonna abrotanifolia* (Harv.) DruceDaria abrotanifolia* Harv.**Status: LR-lc**

Endemism: Endemic

Distribution: Northern Cape

Othonna armiana* van Jaarsv.*Status: LR-nt**

Endemism: Endemic

Distribution: Northern Cape

Othonna burttii* B.Nord.*Status: LR-lc**

Endemism: Endemic

Distribution: KwaZulu-Natal, Eastern Cape

Othonna petiolaris* DC.*Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

***Othonna retrorsa* DC. var. *spektakelensis* (Compt.)**

Rowley

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape

Pentatrachia alata* S.Moore*Status: LR-lc**

Endemism: Endemic

Distribution: Limpopo Province, Mpumalanga

Phymaspermum schroteri* Compton*Status: LR-lc**

Endemism: Endemic

Distribution: Northern Cape, Western Cape

Pteronia tenuifolia* DC.*Status: LR-nt**

Endemism: Endemic

Distribution: Western Cape

Senecio albopunctatus* Bolus*Status: LR-lc**

Endemism: Endemic

Distribution: KwaZulu-Natal, Eastern Cape

Senecio anthemifolius* Harv.*Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

Senecio austromontanus* Hilliard*Status: LR-lc**

Distribution: KwaZulu-Natal, Eastern Cape

Senecio coleophyllus* Turcz.*Status: LR-lc**

Distribution: Western Cape

Senecio foeniculoides* Harv.*Status: LR-nt**

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape

Senecio haworthii* (Sweet) Sch.Bip.*Status: LR-lc**

Endemism: Endemic

Distribution: Northern Cape, Western Cape, Eastern Cape

Senecio medley-woodii* Hutch.*Status: LR-lc**

Endemism: Endemic

Distribution: Mpumalanga, KwaZulu-Natal, Eastern Cape

Senecio muirii* L.Bolus*Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

Senecio paniculatus* P.J.BergiusSenecia diadan* DC.**Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

*Synonym was listed by Hilton-Taylor.****Senecio puberulus* DC.****Status: LR-lc**

Endemism: Endemic

Distribution: Eastern Cape

Senecio pubigerus* L.Senecia anapetes* C.Jeffrey**Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

*Synonym was listed by Hilton-Taylor.****Senecio rehmannii* Bolus****Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

Senecio saniensis* Hilliard & B.L.Burt*Status: LR-lc**

Distribution: KwaZulu-Natal

Senecio sarcoides* (DC.) C.Jeffrey*Status: LR-lc**

Distribution: Western Cape, Northern Cape

Senecio corymbiferus has been taken into synonymy with this taxon, therefore common.***Thaminophyllum latifolium* Bond****Status: LR-nt**

Endemism: Endemic

Distribution: Western Cape

Thaminophyllum mundii* Harv.*Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

Thaminophyllum multiflorum* Harv.*Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

Trichogyne lerouxiae* Beyers*Status: LR-lc**

Endemism: Endemic

Distribution: Northern Cape

Troglophyton acocksianum* Hilliard*Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

Ursinia caranopifolia (Less.) N.E.Br.
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape

Ursinia pygmaea DC.
Status: LR-lc
 Endemism: Endemic
 Distribution: Northern Cape, Western Cape

Ursinia subflasculosa (DC.) Prassler
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape

Vellereaphyton gracillimum Hilliard
Status: LR-nt
 Endemism: Endemic
 Distribution: Western Cape

CAMPANULACEAE

Prismatocarpus cardifolius Adamson
Status: LR-lc
 Endemism: Endemic -
 Distribution: Western Cape

Prismatocarpus decurrens Adamson
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape

Prismatocarpus hispidus Adamson
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape

Prismatocarpus implicatus Adamson
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape

Prismatocarpus lycioides Adamson
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape

Prismatocarpus pauciflorus Adamson
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape

Prismatocarpus pilosus Adamson
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape

Prismatocarpus spinosus Adamson
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape

Rhigiaphyllum squarrosus Hochst.
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape

Raella bryoides H.Buek
Status: LR-lc
 Endemism: Endemic
 Distribution: Northern Cape, Western Cape

Raella compacta Schltr.
Raella cuspidata Adamson var. *hispidus* Adamson
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape
 Synonym was listed by Hilton-Taylor.

Raella incurva A.DC.
Raella rhodantha Adamson
Status: LR-lc
 Endemism: Endemic

Distribution: Western Cape
 Synonym was listed by Hilton-Taylor.

Raella prastrata E.Mey. ex DC.
Raella incurva A.DC. var. *rigida* Adamson
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape
 Synonym was listed by Hilton-Taylor.

Raella spicata L.f.
Raella lightfootioides Schltr.
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape
 Synonym was listed by Hilton-Taylor.

Wahlenbergia adamsanii Lammers
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape

Wahlenbergia androsacea A.DC.
Status: LR-lc
 Endemism: Endemic

Wahlenbergia brachycarpa Schltr.
Status: LR-nt
 Endemism: Endemic
 Distribution: Western Cape

Wahlenbergia brachyphylla (Adamson) Lammers
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape

Wahlenbergia cernua (Thunb.) A.DC.
Wahlenbergia ciliolata A.DC.; *Wahlenbergia clavotula* Brehmer
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape
 Synonyms were listed by Hilton-Taylor.

Wahlenbergia canstricta Brehmer
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape

Wahlenbergia cuspidata Brehmer
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape, Eastern Cape, KwaZulu-Natal

Wahlenbergia ecklanii H.Buek
Wahlenbergia swellendensis H.Buek
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape
 Synonym was listed by Hilton-Taylor.

Wahlenbergia kowiensis R.A.Dyer
Status: LR-lc
 Endemism: Endemic
 Distribution: Eastern Cape

Wahlenbergia levynsiae Lammers
Status: LR-nt
 Endemism: Endemic
 Distribution: Western Cape

Wahlenbergia minuta Brehmer
Status: LR-lc
 Endemism: Endemic
 Distribution: Northern Cape

Wahlenbergia namaquana Sond.
Status: LR-lc
 Endemism: Endemic
 Distribution: Northern Cape

Wahlenbergia aligantha Lammers
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape

Wahlenbergia pinnata Compton
Status: LR-nt
 Distribution: KwaZulu-Natal

Wahlenbergia polyantha Lammers
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape

Wahlenbergia riversdalensis Lammers
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape

CONVOLVULACEAE

Cuscuta kilimanjari Oliv. var. *kilimanjari*
Status: LR-lc
 Distribution: Limpopo Province
 Parasite, mainly on Lamiaceae.

Ipamaea stenosphon Hallier f.
Status: LR-lc
 Endemism: Endemic
 Distribution: Limpopo Province

Paralepisteman shirensis (Oliv.) Lejoly & Lisowski
Status: LR-lc
 Distribution: Limpopo Province

Stictocardia laxiflora (Baker) Hallier f. var. *waadii* (N.E.Br.) Verdc.
Status: LR-lc
 Endemism: Endemic
 Distribution: KwaZulu-Natal

CUCURBITACEAE

Merremia dissecta (Jacq.) Hallier f.
Status: LR-lc

Oreosyce africana Hook.f.
Status: LR-lc
 Distribution: Limpopo Province

CYPERACEAE

Carpha schlechteri C.B.Clarke
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape
 Known from type (Skurweberg) and one other locality.
 Occurs in moist rocky habitats.

Castularia natalensis C.B.Clarke
Status: LR-lc
 Distribution: KwaZulu-Natal, Limpopo Province, Mpumalanga

Cyperus natalensis Hochst.
Status: LR-lc
 Endemism: Endemic
 Distribution: Eastern Cape, KwaZulu-Natal

Ficinia gydamantana T.H.Arnold
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape

Ficinia pygmaea Boeck.
Status: LR-lc
 Endemism: Endemic
 Distribution: Western Cape

Ficinia quinquangularis Baeck.

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Schaenaxiphium ecklonii Nees

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Schoenoxiphium lehmannii (Nees) Steud.

Status: LR-lc

Distribution: Free State, KwaZulu-Natal, Western Cape, Eastern Cape, Mpumalanga, North-West, Limpopo Province

Scirpus varius Boeck. ex C.B.Clarke

Status: LR-lc

Distribution: Limpopo Province, North-West, Gauteng, Mpumalanga, KwaZulu-Natal

Extinct in KwaZulu-Natal due to roodbuilding.

Tetraria brachyphylla Levyns

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape, Eastern Cape

Occurs in sandy soil.

Tetraria compacta Levyns

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Requires taxonomic evolution: related to common and widespread *T. cuspidata* (Rottb.) C.B.Clarke.

Tetraria robusta (Kunth) C.B.Clarke

Tetraria compressa Turrill

Status: LR-lc

Endemism: Endemic

Distribution: KwaZulu-Natal, Western Cape, Eastern Cape

Trianaptilis stipitata Levyns

Status: LR-nt

Endemism: Endemic

Distribution: Northern Cape, Western Cape

HYPOXIDACEAE

Empodium namaquensis (Baker) M.F.Thamps.

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape, Western Cape

Rhodohypoxis incampta Hilliard & B.L.Burtt

Status: LR-nt

Endemism: Endemic

Distribution: KwaZulu-Natal

Restricted to subalpine grasslands at altitude of 2,500 m.

Rhodohypoxis thodiana (Nel) Hilliard & B.L.Burtt

Rhodohypoxis rubella (Baker) Nel var. *thodiana* Nel

Status: LR-nt

Endemism: Endemic

Distribution: KwaZulu-Natal

Restricted to subalpine grasslands at altitude of 2,500 m.

Saniella occidentalis (Nel) B.L.Burtt

Empodium occidentale (Nel) B.L. Burtt

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape, Western Cape

Spilaxene curculigoides (Bolos) Garside

Spilaxene declinata (Nel) Garside

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Spilaxene serrata (Thunb.) Garside

Spilaxene linearis (Andrews) Garside

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape, Western Cape

Spilaxene sp. G.Will. 4482 at NBG; Giess 13055 at

PRE & WIND

Status: LR-lc

Distribution: Northern Cape

LOBELIACEAE

Cyphia oligatricha Schltr.

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Labelia erinus L.

Status: LR-lc

Endemism: Endemic

Distribution: Countrywide

Labelia muscoides Cham.

Status: LR-nt

Endemism: Endemic

Distribution: Western Cape

Localised, but abundant.

Labelia pinifolia L. var. *pinifolia*

Status: LR-lc

Endemism: Endemic

Distribution: Cape

Monopsis flava (Eckl. & Zeyh.) F.Wimmer

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Manopsis kawynensis F.Wimmer

Status: LR-lc

Endemism: Endemic

Distribution: Mpumalanga

Manopsis unidentata (Dryand.) E.Wimm. subsp.

unidentata

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape, Eastern Cape

Wimmerella mariae (F.Wimmer) L.Serra,

M.B.Crespa & Lammers

Laurentia mariae F.Wimmer

Status: LR-nt

Endemism: Endemic

Distribution: Western Cape

The locality is very remote and poorly collected, but the subpopulations are probably relatively secure.

ORCHIDACEAE

Acrolophia barbata (Thunb.) H.P.Linder

Acrolophia lunata (Schltr.) Schltr. & Bolus

Status: LR-lc

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape, Eastern Cape

Montane and coastal flots.

Acralophia balusii Ralfe

Status: LR-nt

Endemism: Endemic

Distribution: Western Cape

Partly sporadic (fire).

Acralophia capensis (Berg.) Faurc.

Acralophia capensis (Berg.) Faurc. var. *capensis*

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape, Eastern Cape

Acralophia micrantha (Lindl.) Schltr. & Bolus

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape, Eastern Cape

Acralophia ustulata (Bolos) Schltr. & Bolus

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Sporadic (fire), minute plants and probably often overlooked.

Angraecum chamaeanthus Schltr.

Status: LR-nt

Distribution: Mpumalanga, Limpopo Province

Ansellia africana Lindl.

Status: LR-nt

Threats: Collection

Distribution: KwaZulu-Natal, Mpumalanga, Limpopo Province

Used for horticultural and medicinal purposes.

Balusiella maudiae (Bolos) Schltr.

Status: LR-lc

Endemism: Endemic

Distribution: KwaZulu-Natal

Banatea speciosa (L.f.) Willd. var. *speciosa*

Status: LR-lc

Endemism: Endemic

Distribution: Eastern Cape, KwaZulu-Natal, Gauteng, North-West, Limpopo Province, Mpumalanga, Western Cape

Brachycarythis macawaniana Rchb.f.

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape, Eastern Cape

Flowers after fire.

Brownleea recurvata Sand.

Status: LR-lc

Distribution: Western Cape, Eastern Cape, KwaZulu-Natal, Mpumalanga

Calanthe sylvatica (Thau.) Lindl.

Status: LR-lc

Distribution: Western Cape, Eastern Cape, KwaZulu-Natal, Mpumalanga, Limpopo Province

Geratandra venasa (Lindl.) Schltr.

Status: LR-nt

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape

Cheirastylis gymnachiloides (Ridl.) Rchb.f.

Status: LR-nt

Distribution: KwaZulu-Natal

Carycium deflexum (Bolos) Ralfe

Status: LR-lc

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape, Northern Cape

Carycium excisum Lindl.

Status: LR-lc

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape

Carycium flanaganii (Bolos) Kurzweil &

H.P.Linder

Status: LR-lc

Distribution: Eastern Cape, KwaZulu-Natal

Carycium ingeanum Oliver

Status: LR-lc

Endemism: Endemic

Distribution: Northern Cape

Corycium orobanchoides* (L.f.) Sw.Corycium vestitum* Sweet**Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

Corycium tricuspidatum* Bolus*Status: LR-lc**

Threats: Afforestation

Distribution: Eastern Cape, KwaZulu-Natal

Corymborkis corymbis* Thou.*Status: LR-nt**

Distribution: Eastern Cape, KwaZulu-Natal

Cynorkis compacta* (Rchb.f.) Rolfe*Status: LR-lc**

Endemism: Endemic

Distribution: KwaZulu-Natal

Disa aurata* (Bolus) Parker & KoopowitzDisa tripetaloides* (L.f.) N.E.Br. subsp. *aurata* (Bolus) H.P.Linder**Status: LR-lc**

Endemism: Endemic

Threats: Collection

Distribution: Western Cape

*Affected by baboon activity.****Disa basutorum* Schltr.****Status: LR-lc**

Distribution: Eastern Cape, KwaZulu-Natal

Disa begleyi* L.Bolus*Status: LR-nt**

Endemism: Endemic

Distribution: Western Cape

Disa bodkinii* Bolus*Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

*Sporadic (fire).****Disa brachyceras* Lindl.****Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

Disa caffra* Bolus*Status: LR-lc**

Distribution: Eastern Cape, KwaZulu-Natal

Disa cardinalis* H.P.Linder*Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

*Localised.****Disa cephalotes* Rchb.f. subsp. *frigida* (Schltr.)****H.P.Linder****Status: LR-lc**

Distribution: KwaZulu-Natal

Disa cernua* (Thunb.) Sw.Manadenia cernua* (Thunb.) Dur. & Schinz**Status: LR-nt**

Endemism: Endemic

Threats: Habitat degradation, alien plant infestation

Distribution: Western Cape, Eastern Cape

Disa extinctoria* Rchb.f.*Status: LR-lc**

Distribution: Mpumalanga, Limpopo Province

Disa forficaria* BolusHerschelianthe forficaria* (Bolus) N.C.Anthony**Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

*May be extinct.****Disa longifolia* Lindl.****Status: LR-nt**

Endemism: Endemic

Threats: Damming

Distribution: Western Cape

*Morsh environment. Large populations.****Disa lugens* Bolus var. *lugens****Herschelianthe lugens*-(Bolus) Rauschert var. *lugens***Status: LR-nt**

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape, Eastern Cape

*Declined in the past (Cape Flots) but more than three generations ago.****Disa marlothii* Bolus****Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape, Eastern Cape

Disa micropetala* Schltr.*Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape, Eastern Cape

Disa minor* (Sond.) Rchb.f.*Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

Disa montana* Sond.*Status: LR-lc**

Endemism: Endemic

Distribution: Eastern Cape

Disa multifida* Lindl.Herschelianthe multifida* (Lindl.) Rauschert**Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

Disa nervosa* Lindl.*Status: LR-lc**

Threats: Afforestation

Distribution: Eastern Cape, KwaZulu-Natal,

Mpumalanga

Disa obtusa* Lindl. subsp. *obtusa**Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

Disa ocellata* Bolus*Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

Disa oreophila* Bolus subsp. *erecta* H.P.Linder*Status: LR-lc**

Distribution: Eastern Cape, KwaZulu-Natal

Disa ovalifolia* Sond.*Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

Disa pillansii* L.Bolus*Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

Disa pulchra* Sond.*Status: LR-lc**

Endemism: Endemic

Threats: Afforestation

Distribution: Eastern Cape, KwaZulu-Natal, Free State

Disa pygmaea* BolusMonadenia pygmaea* (Bolus) T.Durand & Schinz**Status: LR-nt**

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape

*Probably fire dependent.****Disa rhodantha* Schltr.****Status: LR-lc**

Distribution: Eastern Cape, KwaZulu-Natal,

Mpumalanga, Limpopo Province

Disa salteri* Lewis*Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

Disa sankeyi* Rolfe*Status: LR-lc**

Distribution: Eastern Cape, KwaZulu-Natal

Disa spathulata* (L.f.) Sw. subsp. *spathulata*Herschelianthe spathulata* (L.f.) Rauschert subsp. *spathulata***Status: LR-lc**

Endemism: Endemic

Threats: Urban expansion, agriculture

Distribution: Western Cape, Northern Cape

Disa stachyoides* Rchb.f.*Status: LR-lc**

Threats: Afforestation

Distribution: Eastern Cape, KwaZulu-Natal, Free State,

Mpumalanga, Limpopo Province

*Very common.****Disa tenuicornis* Bolus****Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

Disa tenuis* Lindl.*Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape

Disa thodei* Schltr. ex Kraenzl.*Status: LR-lc**

Threats: Afforestation

Distribution: Eastern Cape, KwaZulu-Natal,

Mpumalanga

Disa tripetaloides* (L.f.) N.E.Br.Disa tripetaloides* (L.f.) N.E.Br. subsp. *tripetaloides***Status: LR-lc**

Endemism: Endemic

Distribution: Western Cape, Eastern Cape, KwaZulu-Natal

*Very common in suitable habitats.****Disa tysonii* Bolus****Status: LR-lc**

Threats: Afforestation

Distribution: Eastern Cape, KwaZulu-Natal

Disa venusta* BolusHerschelianthe venusta* (Bolus) Rauschert**Status: LR-nt**

Endemism: Endemic

Threats: Habitat degradation, collection

Distribution: Western Cape, Eastern Cape

Disa welwitschii* Rchb.f. subsp. *welwitschii**Status: LR-lc**

Distribution: Limpopo Province

Disa woodii* Schltr.*Status: LR-lc**

Distribution: Eastern Cape, KwaZulu-Natal,

Mpumalanga, Gauteng, Limpopo Province

Disa zuluensis* Rolfe*Status: LR-nt**

Endemism: Endemic

Distribution: KwaZulu-Natal, Mpumalanga

Disperis bodkinii* Bolus*Status: LR-nt**

Endemism: Endemic

Threats: Habitat degradation
Distribution: Western Cape
Tiny plants and therefore often overlooked.

***Disperis bolusiano* Schltr. ex Bolus subsp. *microcorys* (Rolfe) J.C.Manning**
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape

***Disperis concinno* Schltr.**
Status: LR-lc
Threats: Afforestation
Distribution: KwaZulu-Natal, Gauteng, Mpumalanga

***Disperis cooperi* Harv.**
Status: LR-lc
Endemism: Endemic
Threats: Afforestation
Distribution: KwaZulu-Natal, Free State, Mpumalanga

***Disperis johnstonii* Rolfe**
Status: LR-lc
Endemism: Endemic
Threats: Urban expansion, agriculture, alien plant infestation, habitat degradation
Distribution: KwaZulu-Natal
Not listed previously.

***Disperis stenopteron* Rchb.f.**
Status: LR-lc
Threats: Afforestation
Distribution: Eastern Cape, KwaZulu-Natal, Mpumalanga

***Disperis tysonii* Bolus**
Status: LR-lc
Threats: Afforestation
Distribution: KwaZulu-Natal, Eastern Cape, Mpumalanga

***Disperis weolei* Rchb.f.**
Status: LR-lc
Threats: Afforestation
Distribution: Eastern Cape, KwaZulu-Natal, Mpumalanga, Limpopo Province

***Disperis woodii* Schltr.**
Status: LR-lc
Endemism: Endemic
Distribution: Eastern Cape, KwaZulu-Natal

***Eulophia cooperi* Rchb.f.**
Status: LR-lc
Endemism: Endemic
Threats: Afforestation
Distribution: Free State, Gauteng, Mpumalanga, Limpopo Province

***Eulophia holubii* Rolfe**
Status: LR-lc

***Eulophia litoralis* Schltr.**
Status: LR-nt
Endemism: Endemic
Distribution: Western Cape

***Eulophia meleagris* Rchb.f.**
Status: LR-lc
Endemism: Endemic
Distribution: Eastern Cape, KwaZulu-Natal

***Eulophia plotypetolo* Lindl.**
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape, Eastern Cape

***Eulophia speciosa* (R.Br. ex Lindl.) Bolus**
Status: LR-lc
Distribution: Southern and eastern provinces

***Eulophia tabularis* (L.f.) Bolus**
Status: LR-lc
Endemism: Endemic

Distribution: Western Cape, Eastern Cape, Northern Cape

***Eulophia zeyheriano* Sond.**
Status: LR-lc
Endemism: Endemic
Threats: Afforestation
Distribution: Eastern Cape, KwaZulu-Natal, Mpumalanga

***Evotella rubiginosa* (Sond. ex Bolus) Kurzweil & H.P.Linder**
Status: LR-nt
Endemism: Endemic
Threats: Habitat degradation
Distribution: Western Cape
Dependent on fire for recruitment.

***Habenorio bicolor* Conrath & Kraenzlin**
Status: LR-nt
Distribution: Gauteng

***Habenaria humilior* Rchb.f.**
Status: LR-lc
Distribution: KwaZulu-Natal, Gauteng, Limpopo Province

***Habenaria kraenzliniona* Schltr.**
Status: LR-lc
Endemism: Endemic
Distribution: KwaZulu-Natal, Gauteng, Limpopo Province

***Holothrix aspero* (Lindl.) Rchb.f.**
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape, Northern Cape

***Holothrix filicornis* Immelman & Schelpe**
Status: LR-lc
Distribution: Northern Cape

***Holothrix grandiflora* (Sond.) Rchb.f.**
Status: LR-nt
Endemism: Endemic
Distribution: Western Cape, Eastern Cape

***Holothrix mocowoniono* Rchb.f.**
Status: LR-lc
Endemism: Endemic
Distribution: Eastern Cape

***Holothrix mundii* Sond.**
Status: LR-lc
Endemism: Endemic
Threats: Urban expansion, alien plant infestation, habitat degradation, agriculture
Distribution: Western Cape, Eastern Cape
Inconspicuous; rare.

***Holothrix pilosa* (Burch. ex Lindl.) Rchb.f.**
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape, Eastern Cape
Uncommon; not fire dependent.

***Holothrix villosa* Lindl. var. *condensata* (Sond.) Immelman**
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape, Eastern Cape
Should be a distinct species.

***Huttonaea woodii* Schltr.**
Status: LR-nt
Endemism: Endemic
Threats: Afforestation
Distribution: KwaZulu-Natal

***Jumelleo wollerii* (Rolfe) la Croix**
Jumelleo filicornoides (De Wild.) Schltr.
Status: LR-lc
Distribution: KwaZulu-Natal, Limpopo Province

***Neobolusia tysonii* (Bolus) Schltr.**
Status: LR-lc
Distribution: Eastern Cape, KwaZulu-Natal, Free State, Mpumalanga, Limpopo Province

***Nervilia bicarinata* (Blume) Schltr.**
Status: LR-lc
Distribution: KwaZulu-Natal, Mpumalanga, Limpopo Province

***Nervilia kotschyi* (Rchb.f.) Schltr. var. *purpurata* (Rchb.f. & Sond.) Pettersson**
Status: LR-lc
Distribution: Mpumalanga, Gauteng, North-West

***Nervilia renschiona* (Rchb.f.) Schltr.**
Status: LR-lc
Distribution: KwaZulu-Natal

***Pochites appresso* Lindl.**
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape

***Pochites bodkinii* Bolus**
Status: LR-nt
Endemism: Endemic
Threats: Fire
Distribution: Western Cape
Fire dependent species.

***Platylepis glondulosa* (Lindl.) Rchb.f.**
Status: LR-nt
Distribution: KwaZulu-Natal

***Polystochyo olbescens* Ridl. subsp. *imbricoto* (Rolfe) Summerh.**
Status: LR-lc
Distribution: Mpumalanga, Limpopo Province

***Pterygodium newdigoteae* Bolus var. *cleistogamum* Bolus**
Status: LR-nt
Endemism: Endemic
Threats: Habitat degradation
Distribution: Western Cape, Eastern Cape

***Pterygodium penterianum* Schltr.**
Status: LR-lc
Endemism: Endemic
Threats: Habitat degradation
Distribution: Western Cape

***Pterygodium schelpei* H.P.Linder**
Status: LR-lc
Endemism: Endemic
Threats: Habitat degradation
Distribution: Western Cape, Northern Cape

***Sotyrimum carneum* (Dryand.) Sims**
Status: LR-nt
Endemism: Endemic
Threats: Collection, urban expansion, agriculture
Distribution: Western Cape

***Sotyrimum foliosum* Sw.**
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape

***Sotyrimum microrrhynchum* Schltr.**
Status: LR-lc
Endemism: Endemic
Threats: Afforestation
Distribution: Eastern Cape, KwaZulu-Natal, Mpumalanga

***Sotyrimum princeps* Bolus**
Status: LR-nt
Endemism: Endemic
Threats: Urban expansion, alien plant infestation
Distribution: Western Cape, Eastern Cape
Coastal development is a threat.

Satyrium rhynchanthum Bolus

Satyridium rastratum Lindl.

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Schizochilus cecilii Rolfe subsp. *transvaalensis*

(Rolfe) H.P.Linder

Status: LR-nt

Endemism: Endemic

Threats: Afforestation

Distribution: Mpumalanga, Limpopo Province

Threatened by pine plantations.

Schizochilus crenulatus H.P.Linder

Status: LR-nt

Endemism: Endemic

Distribution: Mpumalanga

Schizachilus flexuosus Harv. ex Rolfe

Status: LR-lc

Threats: Afforestation

Distribution: Eastern Cape, KwaZulu-Natal,

Mpumalanga

Schizochilus zeyheri Sond.

Status: LR-lc

Threats: Afforestation

Distribution: Eastern Cape, KwaZulu-Natal, Free State,

Mpumalanga, Limpopo Province, Gauteng

Schizodium obliquum Lindl. subsp. *obliquum*

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Stenaglattis longifolia Hook.f.

Status: LR-lc

Endemism: Endemic

Distribution: Eastern Cape, KwaZulu-Natal

Perhaps only a robust form of *S. fimbriata*.

ROSACEAE

Cliffortia aculeata Weim.

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Cliffortia acutifolia Weim.

Status: LR-lc

Endemism: Endemic

Threats: Grazing

Distribution: Western Cape

Escorment near Nieuwoudtville, the main centre for the species, is poorly explored and more localities are likely to be discovered. Occurs in an arid environment with low intensity grazing and few fires.

Cliffortia alata N.E.Br.

Status: LR-lc

Endemism: Endemic

Threats: Grazing

Distribution: Western Cape

Occurs on farmland used for goat grazing.

Cliffortia arborea Marloth

Status: LR-nt

Endemism: Endemic

Threats: Harvesting

Distribution: Northern Cape

Used extensively for firewood in the past.

Cliffortia carinata Weim.

Status: LR-lc

Endemism: Endemic

Threats: Alien plant infestation, fire

Distribution: Western Cape

Species belongs to *C. glauca* complex, delimitation of species within this complex is uncertain.

Cliffortia graminea L.f. var. *elegans* Weim.

Status: LR-nt

Endemism: Endemic

Threats: Fire

Distribution: Western Cape

Cliffortia hantamensis Diels

Status: LR-lc

Endemism: Endemic

Threats: Grazing

Distribution: Western Cape

Occurs in an arid environment with low intensity grazing and few fires.

Cliffortia longifolia (Eckl. & Zeyh.) Weim.

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Cliffortia mantana Weim.

Status: LR-lc

Endemism: Endemic

Threats: Fire

Distribution: Western Cape, Eastern Cape

Very poorly collected species, highly likely to be more widespread.

Cliffortia niveniaides Fellingham

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Cliffortia reticulata Eckl. & Zeyh.

Status: LR-nt

Endemism: Endemic

Threats: Fire, alien plant infestation

Distribution: Western Cape

Only collected a few times; collections from Riviersonderend and Kogelberg have sometimes wrongly been attributed to this species. Closely related to *C. pilifera*.

Cliffortia strigosa Weim.

Status: LR-lc

Endemism: Endemic

Threats: Fire

Distribution: Western Cape

Possibly nothing more than a very hairy variant of the more widespread *C. virgata*, intermediate (hybrid?) forms occur around Bainskloof.

RUTACEAE

Acmadenia densifolia Sond.

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Acmadenia maculata I.Williams

Status: LR-nt

Endemism: Endemic

Threats: Agriculture

Distribution: Western Cape (Eastern Cape?)

Decline not severe at present, continuous over a long period, but needs to be monitored.

Acmadenia matroosbergensis E.Phillips

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Safe and widespread.

Acmadenia mundiana Eckl. & Zeyh.

Status: LR-nt

Endemism: Endemic

Distribution: Western Cape

Safe.

Acmadenia patentifolia I.Williams

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Acmadenia tenax I.Williams

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Safe where it grows, though restricted in distribution.

Acmadenia tagarana (L.f.) Bartl. & H.L.Wendl.

Status: LR-nt

Endemism: Endemic

Threats: Afforestation, fire, alien plant infestation

Distribution: Western Cape

Robinson Pass area searched in January 2001, but burning a year or two before had decimated the subpopulation (one seedling found). Particularly affected by *Hakea* encroachment.

Adenandra dahlgrenii Strid

Status: LR-nt

Endemism: Endemic

Distribution: Western Cape

Safe.

Adenandra gumifera Strid

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Adenandra marginata (L.f.) Roem. & Schult.

subsp. *mucranata* Strid

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Adenandra ratundifolia Eckl. & Zeyh.

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Adenandra villasa (P.J.Bergius) Licht. ex Roem. &

Schult. subsp. *apiculata* Strid

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Safe.

Adenandra villosa (P.J.Bergius) Licht. ex Roem. &

Schult. subsp. *imbricata* Strid

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

High altitude, inaccessible. Only one specimen at PRE.

Adenandra villosa (P.J.Bergius) Licht. ex Roem. &

Schult. subsp. *pedicellata* Strid

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Adenandra villosa (P.J.Bergius) Licht. ex Roem. &

Schult. subsp. *robusta* Strid

Status: LR-nt

Endemism: Endemic

Threats: Habitat degradation

Distribution: Western Cape

This is a lowland species.

Adenandra villasa (P.J.Bergius) Licht. ex Roem. &

Schult. subsp. *umbellata* (J.C.Wendl.) Strid

Status: LR-lc

Endemism: Endemic

Distribution: Western Cape

Safe.

Agathasma abrupta Pillans

Status: LR-nt

Endemism: Endemic

Distribution: Western Cape

Limestone endemic.

Agathasma acutissima Dummer

Status: LR-lc

Endemism: Endemic

Distribution: Eastern Cape

Agathasma adenandriiflora Schltr.

Status: LR-lc

Endemism: Endemic
Distribution: Western Cape

Agathosma adnata Pillans
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape

Agathosma affinis Sond.
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape

Agathosma bicolor Dummer
Status: LR-nt
Endemism: Endemic
Distribution: Western Cape
Habitat specialist.

Agathosma concava Pillans
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape
Habitat specialist.

Agathosma cordifolia Pillans
Status: LR-nt
Endemism: Endemic
Distribution: Western Cape
Very restricted distribution.

Agathosma dielsiana Schltr. ex Dummer
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape

Agathosma florida Sond.
Status: LR-nt
Endemism: Endemic
Distribution: Western Cape
Very restricted distribution.

Agathosma florulenta Sond.
Status: LR-nt
Endemism: Endemic
Distribution: Western Cape
Seasonally wet limestone specialist.

Agathosma foetidissima (Bartl. & Wendl.) Steud.
Status: LR-nt
Endemism: Endemic
Threats: Agriculture, grazing/browsing
Distribution: Western Cape
If number of locations drops to fewer than ten, this species will become vulnerable. Affected by trampling.

Agathosma foleyana Dummer
Status: LR-nt
Endemism: Endemic
Distribution: Western Cape
Habitat specialist.

Agathosma leptospermoides Sond.
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape

Agathosma linifolia (Roem. & Schult.) Bartl. & Wendl.
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape

Agathosma longicornu Pillans
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape

Agathosma martiana Sond.
Status: LR-lc
Endemism: Endemic
Distribution: Eastern Cape

Agathosma namaquensis Pillans
Status: LR-lc
Endemism: Endemic
Threats: Fire
Distribution: Northern Cape
Restricted to only a few peaks.

Agathosma ovata (Thunb.) Pillans
Status: LR-lc
Distribution: Eastern Cape, Western Cape, KwaZulu-Natal

Agathosma planifolia Sond.
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape

Agathosma scaberula Dummer
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape

Agathosma serpyllacea Licht. ex Roem. & Schult.
Status: LR-lc
Endemism: Endemic
Distribution: Eastern Cape, Western Cape

Agathosma squamosa (Roem. & Schult.) Bartl. & H.L.Wendl.
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape

Agathosma stenosepala Pillans
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape

Agathosma stokoei Pillans
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape

Agathosma uncarpellata (Fourc.) Pillans
Status: LR-lc
Endemism: Endemic
Distribution: Eastern Cape

Diosma arenicola I.Williams
Status: LR-nt
Endemism: Endemic
Threats: Agriculture
Distribution: Western Cape

Diosma awilana I.Williams
Status: LR-nt
Endemism: Endemic
Threats: Agriculture
Distribution: Western Cape

Diosma demissa I.Williams
Status: LR-lc
Endemism: Endemic
Threats: Fire
Distribution: Western Cape

Diosma tenella I.Williams
Status: LR-nt
Endemism: Endemic
Threats: Afforestation, agriculture
Distribution: Western Cape
Extinct in many historically recorded localities.

Euchaetis esterhuyseniae I.Williams
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape
Safe on high mountains.

Euchaetis laevigata Turcz.
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape
Should possibly be listed as Not Threatened.

Euchaetis linearis Sond.
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape

Euchaetis meridionalis I.Williams
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape

Euchaetis pungens (Bartl. & H.L.Wendl.) I.Williams
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape

Euchaetis schlechteri Schinz
Status: LR-nt
Endemism: Endemic
Threats: Agriculture
Distribution: Western Cape
May have been largely eliminated by cultivation.

Macrostylis villosa (Thunb.) Sond. subsp. *villosa*
Status: LR-nt
Endemism: Endemic
Threats: Urban expansion, alien plant infestation
Distribution: Western Cape
Many areas where it once flourished are now transformed by urbanisation and alien vegetation.

SOLANACEAE

Solanum africanum Mill.
Solanum crossifolium Lam.
Status: LR-lc
Endemism: Endemic
Synonym was listed by Hilton-Taylor.

THYMELAEACEAE

Englerodaphne pilosa Burtt Davy
Status: LR-lc
Endemism: Endemic
Distribution: Gauteng, Eastern Cape, KwaZulu-Natal
Fairly common in Natal Midlands and Eastern Cape forests.

Gnidia leipoldtii C.H.Wright
Status: LR-lc
Endemism: Endemic
Distribution: Northern Cape, Eastern Cape

Gnidia parviflora Meisn.
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape

Gnidia scabrida Meisn.
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape

Lachnaea eriocephala L.
Lachnaea purpurea Andrews
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape

Lachnaea glomerata Fourc.
Status: LR-lc
Endemism: Endemic
Distribution: Western Cape, Eastern Cape

Lachnaea striata (Poir.) Meisn.
Status: LR-nt
Endemism: Endemic
Distribution: Western Cape
Last collection was made in 1971. It appears to be very scarce.

Passerina ericoides L.

Status: LR-nt

Endemism: Endemic

Threats: Urban expansion, alien plant infestation

Distribution: Western Cape

Large portions of coast along Cape Peninsula affected by human impact and alien vegetation of Cape Town area.

Passerina esterhuyseniae Bredenk. & A.E.van Wyk

Status: LR-lc

Endemism: Endemic

Threats: Fire

Distribution: Western Cape

High mountain tops, restricted distribution, small subpopulations.

Passerina filiformis L. subsp. *glutinosa* (Thoday)

Bredenk. & A.E.van Wyk

Status: LR-nt

Endemism: Endemic

Threats: Urban expansion, alien plant infestation

Distribution: Western Cape

Deep acid sands on flats, heavily transformed, and a small proportion conserved.

Passerina nivicola Bredenk. & A.E.van Wyk

Status: LR-lc

Endemism: Endemic

Threats: Grazing

Distribution: Northern Cape, Western Cape

Occurring in snow about four months per annum.

Struthiola congesta C.H.Wright

Status: LR-lc

Endemism: Endemic

Distribution: Eastern Cape, KwaZulu-Natal

Struthiola pondoensis Gilg ex C.H.Wright

Status: LR-lc

Endemism: Endemic

Distribution: Eastern Cape, KwaZulu-Natal



Frithia pulchra is one of the few mesemb genera from the summer rainfall area. This species is known from only two subpopulations.

(Photo: P. Burgoyne)



Aloe peglerae, an endangered endemic. (Photo: NBI)



Black Mountain, a gem that is close to the heart of the world's most arid hotspot, the Succulent Karoo.

(Photo: P. Burgoyne)

AIZOACEAE

Conophytum lithopsoides L.Bolus subsp. *boreale* (L.Bolus) S.A.Hammer
Status: DD
 Endemism: Endemic
 Distribution: Northern Cape
Type locality vague, never rediscovered.

ALOACEAE

Aloe cooperi Baker subsp. *pulchra* Glen & D.S.Hardy
Status: DD
 Endemism: Endemic
 Distribution: KwaZulu-Natal

Aloe gracilis Haw. var. *decumbens* Reynolds
Status: DD
 Endemism: Endemic
 Distribution: Western Cape

Aloe modesta Reynolds
Status: DD
 Endemism: Endemic
 Threats: Collection, afforestation
 Distribution: Mpumalanga, KwaZulu-Natal
Inconspicuous and unknown. Known to be illegally collected.

Aloe parviflora Baker
Status: DD
 Endemism: Endemic
 Distribution: KwaZulu-Natal
Inconspicuous grass aloe.

Aloe vogtsii Reynolds
Status: DD
 Endemism: Endemic
 Threats: Afforestation, agriculture, urban expansion
 Distribution: Limpopo Province

AMARYLLIDACEAE

Apodolirion amiana D.Mull.-Doblies
Status: DD
 Endemism: Endemic
 Distribution: Eastern Cape
The description of this species was published in 1984, but the types have never been distributed to herbaria.

Apodolirion bolusii Baker
Status: DD
 Endemism: Endemic
 Distribution: Eastern Cape
Known only from the type collection; taxonomically valid but undercollected because flowers are extremely ephemeral and appear in mid-summer.

Apodolirion macowanii Baker
Status: DD
 Endemism: Endemic
 Threats: Urban expansion, habitat degradation
 Distribution: Eastern Cape
This species has been seldom collected, mainly prior to the 1950s. The only subpopulation seen was on the Farm Slooikrool outside Grahamstown, where the habitat was very degraded through grazing. Heavy cattle farming is reported as being a serious threat.

Gethyllis britteniana Baker subsp. *bruynsii* D.Mull.-Doblies
Status: DD
 Endemism: Endemic
 Distribution: Northern Cape
Only known from the type.

Gethyllis britteniana Baker subsp. *herrei* (L.Bolus) D.Mull.-Doblies
Status: DD
 Endemism: Endemic
 Distribution: Northern Cape
Only known from the type.

Gethyllis fimbriatula D.Mull.-Doblies
Status: DD
 Endemism: Endemic
 Distribution: Western Cape
Known only from description. Probably a local form of the widespread G. lanuginosa Morl.

Gethyllis latifolia Masson ex Baker
Status: DD
 Endemism: Endemic
 Distribution: Western Cape
Material from near Vredenburg matches the type. This is probably a local form of the widespread G. ciliaris (Thunb.) Thunb.

Nerine gibsonii Douglas
Status: DD
 Endemism: Endemic
 Threats: Habitat degradation
 Distribution: Eastern Cape

Nerine sp. A Bayer 52
Status: DD
 Endemism: Endemic
 Distribution: Western Cape
May be a local form of the widespread N. humilis (Jacq.) Herb.

APOCYNACEAE

Brachystelma comptum N.E.Br.
Status: DD
 Endemism: Endemic
 Distribution: Eastern Cape

Brachystelma gracillimum R.A.Dyer
Status: DD
 Endemism: Endemic
 Distribution: KwaZulu-Natal

Brachystelma hirtellum Weim.
Status: DD
 Distribution: Possibly not in South Africa
Waterberg species is B. pilosum.

Brachystelma micranthum E.Mey.
Status: DD
 Endemism: Endemic
 Distribution: Eastern Cape

Brachystelma schoenlandianum Schltr.
Status: DD
 Endemism: Endemic
 Distribution: Eastern Cape

Brachystelma tabularium R.A.Dyer
Status: DD
 Endemism: Endemic
 Distribution: Eastern Cape
Probably B. circinatum—tips of corollo sometimes inflex in cultivation; corono matches B. circinatum.

Ceropegia barbata R.A.Dyer
Status: DD
 Endemism: Endemic
 Distribution: Western Cape?

Ceropegia bowkeri Harv. subsp. *bowkeri*
Status: DD
 Endemism: Endemic
 Distribution: Eastern Cape

Ceropegia dubia R.A.Dyer
Status: DD
 Endemism: Endemic
 Distribution: Eastern Cape

Ceropegia occidentalis R.A.Dyer
Status: DD
 Endemism: Endemic
 Distribution: Northern Cape
Similar to C. africana, may be conspecific.

Ceropegia rudatisii Schltr.
Status: DD
 Endemism: Endemic
 Threats: Agriculture
 Distribution: KwaZulu-Natal
Probably CR or EX; not seen in recent years. Threatened by sugarcane and banana plantations.

Ceropegia tomentosa Schltr.
Status: DD
 Endemism: Endemic
 Distribution: Eastern Cape

ASTERACEAE

Alciope lanata (Thunb.) DC.
Status: DD
 Endemism: Endemic
 Distribution: Western Cape
Could be extinct in the wild; not collected during the 20th century.

Gnaphalium nelsonii Burtt Davy
Status: DD
 Endemism: Endemic
 Threats: Urban expansion
 Distribution: North-West, Gauteng
Seldom collected.

Helichrysum archeri Compton
Status: DD
 Endemism: Endemic
 Distribution: Western Cape

Helichrysum leptorhizum DC.
Status: DD
 Endemism: Endemic
 Distribution: Northern Cape
Lost collected in 1897. Possibly extinct.

Othonna linearifolia (DC.) Sch.Bip.
Doria linearifolia DC.
Status: DD
 Endemism: Endemic

Othonna pinnatilobata Sch.Bip.
Status: DD
 Endemism: Endemic

Othonna tephrosioides Sond.
Status: DD
 Endemism: Endemic
 Distribution: Western Cape

Senecio erysimoides DC.
Status: DD
 Endemism: Endemic
 Distribution: Northern Cape

Senecio microspermus DC.
Status: DD
 Endemism: Endemic
 Distribution: Eastern Cape
Taxonomic problem. Not collected after Drège in 1835.

Senecio thunbergii Harv.
Status: DD

Endemism: Endemic
Distribution: Western Cape?
Toxonomic problem.

Senecio trachylaenus Harv.
Status: DD
Endemism: Endemic
Distribution: Northern Cape
Toxonomic problem.

Senecio trachyphyllus Schltr.
Status: DD
Endemism: Endemic
Distribution: Western Cape
Toxonomic problem.

CAMPANULACEAE

Prismatocarpus fastigiatus C.Presl ex A.DC.
Status: DD
Endemism: Endemic
Distribution: Western Cape
Possibly known only from type.

Roella latiloba A.DC.
Status: DD
Endemism: Endemic
Distribution: Western Cape

Wahlenbergia annuliformis Brehmer
Status: DD
Endemism: Endemic
Toxonomic problem.

Wahlenbergia asperifolia Brehmer
Status: DD
Endemism: Endemic
Distribution: Western Cape
Lost collected in 1900. Needs revision.

Wahlenbergia bolusiana Schltr. & Brehmer
Status: DD
Endemism: Endemic
Toxonomic problem.

Wahlenbergia bowkeriae Sond.
Status: DD
Endemism: Endemic
Distribution: Eastern Cape
Known from type only.

Wahlenbergia buseriana Schltr. & Brehmer
Status: DD
Endemism: Endemic
Distribution: Northern Cape
Known from type only.

Wahlenbergia compacta Brehmer
Status: DD
Endemism: Endemic
Toxonomic problem.

Wahlenbergia debilis H.Buek
Status: DD
Endemism: Endemic
Toxonomic problem.

Wahlenbergia distincta Brehmer
Status: DD
Endemism: Endemic
Toxonomic problem.

Wahlenbergia divergens A.DC.
Status: DD
Endemism: Endemic
Toxonomic problem.

Wahlenbergia dunantii A.DC.
Status: DD
Endemism: Endemic
Toxonomic problem.

Wahlenbergia effusa (Adamson) Lammers
Status: DD
Endemism: Endemic
Distribution: Western Cape

Wahlenbergia floribunda Schltr. & Brehmer
Status: DD
Endemism: Endemic
Distribution: Northern Cape

Wahlenbergia lasiocarpa Schltr. & Brehmer
Status: DD
Endemism: Endemic
Distribution: Northern Cape

Wahlenbergia longispala Brehmer
Status: DD
Endemism: Endemic
Toxonomic problem.

Wahlenbergia massonii A.DC.
Status: DD
Endemism: Endemic
Distribution: Western Cape
Known from type only.

Wahlenbergia mollis Brehmer
Status: DD
Endemism: Endemic
Toxonomic problem.

Wahlenbergia oligotricha Schltr. & Brehmer
Status: DD
Endemism: Endemic
Toxonomic problem.

Wahlenbergia polyclada A.DC.
Status: DD
Endemism: Endemic
Distribution: Western Cape

Wahlenbergia ramifera Brehmer
Status: DD
Endemism: Endemic
Toxonomic problem.

Wahlenbergia rara Schltr. & Brehmer
Status: DD
Endemism: Endemic
Distribution: Northern Cape

Wahlenbergia roelliflora Schltr. & Brehmer
Status: DD
Endemism: Endemic
Distribution: Northern Cape
Known from type only.

Wahlenbergia saxifragoides Brehmer
Status: DD
Endemism: Endemic
Toxonomic problem.

Wahlenbergia schistacea Brehmer
Status: DD
Endemism: Endemic
Toxonomic problem.

Wahlenbergia serpentina Brehmer
Status: DD
Endemism: Endemic
Toxonomic problem.

Wahlenbergia subpilosa Brehmer
Status: DD
Endemism: Endemic
Toxonomic problem.

Wahlenbergia subtilis Brehmer
Status: DD
Endemism: Endemic
Toxonomic problem.

Wahlenbergia tomentosula Brehmer
Status: DD

Endemism: Endemic
Threats: Agriculture
Distribution: Western Cape

Wahlenbergia tumida Brehmer
Status: DD
Endemism: Endemic
Threats: Agriculture
Distribution: Western Cape, Northern Cape

CONVOLVULACEAE

Merremia malvifolia Rendle
Status: DD
Endemism: Endemic
Distribution: Eastern Cape
Possibly extinct. Last collected in 19th century.

CYPERACEAE

Ficinia micrantha C.B.Clarke
Status: DD
Endemism: Endemic
Distribution: Western Cape

Isolepis inconspicua (Levyms) J.Raynal
Scirpus inconspicua Levyms
Status: DD
Endemism: Endemic
Distribution: Western Cape
Requires toxonomic study.

Schoenoxiphium strictum Kukkonen
Status: DD
Endemism: Endemic
Distribution: KwaZulu-Natal
Known only from type.

Scirpus delicatulus (Nees) Levyms
Status: DD
Endemism: Endemic
Distribution: Western Cape
Is on Isolepis species; may be a synonym of Scirpus bulbiferus Boeck. Toxonomic evolution required.

Tetraria paludosa Levyms
Status: DD
Endemism: Endemic
Distribution: Western Cape
Requires toxonomic evolution: related to common and widespread T. cuspidata (Rottb.) C.B.Clarke.

DIPSACACEAE

Cephalaria decurrens (Thunb.) Roem. & Schult.
Status: DD
Endemism: Endemic
Distribution: Western Cape
Not collected since 19th century, possibly extinct.

LOBELIACEAE

Cyphia bolusii E.Phillips
Status: DD
Distribution: KwaZulu-Natal, Mpumalanga

Cyphia comptonii Bond
Status: DD
Endemism: Endemic
Distribution: Western Cape

Cyphia corylifolia Harv.
Status: DD
Endemism: Endemic
Distribution: KwaZulu-Natal

Cyphia dentariifolia C.Presl var. dentariifolia
Status: DD

Endemism: Endemic
Distribution: Western Cape

Cyphia langiflora Schltr.
Status: DD
Endemism: Endemic
Distribution: Northern Cape

Cyphia langilabata E.Phillips
Status: DD
Endemism: Endemic
Distribution: Cape

Cyphia ranunculifolia E.Wimm.
Status: DD
Endemism: Endemic
Distribution: Cape

Cyphia tortilis N.E.Br.
Status: DD
Endemism: Endemic
Distribution: Eastern Cape

Labelia areas F.Wimmer
Status: DD
Endemism: Endemic
Distribution: KwaZulu-Natal
Toxonomic status of this plant uncertain, related to the widespread L. flaccida.

Wimmerella bifida (Thunb.) L.Serra, M.B.Crespo & Lammers
Laurentia giftbergensis (E.Phillips) F.Wimmer
Status: DD
Endemism: Endemic
Distribution: Western Cape
L. giftbergensis is doubtfully distinct from the common and widespread W. bifida; if recognised probably rates as VU D2.

ORCHIDACEAE

Corycium bifidum Sond.
Status: DD
Endemism: Endemic
Threats: Habitat degradation
Distribution: Western Cape

Disa galpinii Rolfe
Status: DD
Endemism: Endemic
Threats: Afforestation
Distribution: Eastern Cape, KwaZulu-Natal

Disa pygmaea Bolus
Manadenia pygmaea (Bolus) T.Durand & Schinz
Status: DD
Endemism: Endemic
Threats: Urban expansion, agriculture
Distribution: Western Cape

Disa sanguinea Sond.
Status: DD
Endemism: Endemic
Distribution: Eastern Cape, KwaZulu-Natal

Oberania disticha (Lam.) Schltr.
Status: DD
Distribution: Limpopo Province

Palystachya zuluensis L.Bolus
Status: DD
Distribution: KwaZulu-Natal

Schizochilus gerrardii (Rchb.f.) Bolus
Status: DD
Endemism: Endemic
Threats: Afforestation
Distribution: KwaZulu-Natal
Threatened by pine plantations.

Schizochilus lilacinus H.P.Linder
Status: DD
Endemism: Endemic
Distribution: Mpumalanga

ROSACEAE

Cliffortia crenulata Weim.
Status: DD
Endemism: Endemic
Distribution: Western Cape
Only collected once in 1894. Locality is imprecise, but the altitude fits the lower slopes of the mountains around Riversonderend. Possibly a variant of C. varians, a more recently collected, but still localised species.

Cliffortia cymbifolia Weim.
Status: DD
Endemism: Endemic
Distribution: Western Cape

Cliffortia intermedia Eckl. & Zeyh.
Status: DD
Endemism: Endemic
Distribution: Western Cape

Cliffortia multifarmis Weim.
Status: DD
Endemism: Endemic

RUTACEAE

Acmadenia baileyensis I.Williams
Status: DD
Endemism: Endemic
Threats: Urban expansion
Distribution: Western Cape
Inaccessible locality.

Adenandra multiflora Strid
Status: DD
Endemism: Endemic
Distribution: Western Cape

Agathasma alaris Cham.
Status: DD
Endemism: Endemic
Distribution: Western Cape?
Extinct? No specimens in PRE.

Agathasma sabulosa Sond.
Status: DD
Endemism: Endemic
Distribution: Western Cape
Possibly a synonym of A. involucreata.

Agathasma sp. Bean 480
Status: DD
Endemism: Endemic
Distribution: Western Cape

Diosma aspalathoides Lam.
Status: DD
Endemism: Endemic
Threats: Urban expansion
Distribution: Western Cape

Diosma dichatama P.J.Bergius
Status: DD
Endemism: Endemic
Threats: Urban expansion
Distribution: Western Cape

Diosma guthriei P.E.Glover
Status: DD
Endemism: Endemic
Threats: Agriculture
Distribution: Western Cape

Macrostylis cauliflora I.Williams
Status: DD
Endemism: Endemic
Distribution: Western Cape

THYMELAEACEAE

Gnidia singularis Hilliard
Status: DD
Distribution: KwaZulu-Natal



Gerrardanthus tomentosus, a caudiciform, is classified as *Rare* (Hilton-Taylor, 1996) and is known only from a few specimens in the Durban Metropole. (Photo: R. Symmonds)



Conophytum burgeri is cryptic amongst the quartzite pebbles of the Succulent Karoo. (Photo: P. Burgoyne)



Titus S. Dlamini* & Gideon M. Dlamini*

Introduction

Swaziland has a human population of about one million and a total area of more than 17,000 km². The vegetation of Swaziland ranges from open grassland to forest, and from semi-arid savanna to wetlands. Owing to steep gradients of climate, topography (altitude range is 90–1,862 m), and edaphic characteristics, the country's flora is extraordinarily rich. Swaziland is divided into four distinct physiographic zones, running from north to south: Highveld, Middleveld, Lowveld, and the Lebombo Plateau. Rainfall is highest in the Highveld and lowest in the Lowveld; most of the rain (about 85%) falls in summer.

The main authoritative work on the flora of Swaziland was undertaken by Compton (1976). Subsequent updates to this work have been compiled by Kemp (1981, 1983) and Braun (<http://www.sntc.org.sz/biodiversity/sdflora.html>). Although plant collecting for herbarium purposes has been taking place since the late 1800s, it has been sporadic. Braun & Dlamini (1994), therefore, emphasised that to conserve threat-

ened plant species in Swaziland, more field investigations need to take place and collecting intensity ought to be augmented. This was substantiated in an analysis of herbarium collections from two adjacent 25 km² grid cells—it was found that one contained 15 times more species than the other (1,177 compared to 87 species). This gross disparity was attributed to a higher collecting intensity in protected areas compared to unprotected areas in Swaziland (Braun & Dlamini 1994).

Although the country's knowledge of its indigenous flora is still at a developmental stage, current records indicate that there are over 3,400 species of higher plants in Swaziland, representing 771 genera in 135 families. The Swaziland National Herbarium (SDNH) holds about 7,450 specimens of higher plants.

Moreover, compared to the other southern African countries, Swaziland forms less than 1% of the land area, yet it contains almost 11% of the taxa recorded in the region. About 4% of the country is formally protected; the main focus is the conserva-

Capital: Mbabane, largest town

Area: 17,365 km²

Languages: English, Swazi (both official)

Currency: Emalangeni (E), on a par with South African Rand

Total plant species: 3,400

Total plant endemics: 12

Total RDL plants: 305

Focal RDL institutions: SDNH

Number of Protected Areas: six nature reserves managed by the SNTC, three managed by the Big Game Parks.

Population: 1,091,470 **Growth Rate:** 2.9% **Density:** 55.7 people/km²

Phytogeography: Predominantly Tonga–Pondoland Regional Mosaic, with Kalahari–Highveld Regional Mosaic in the west.

Flora: North Eastern Mountain Grassland to the west of the country with pockets of Afromontane forest merging eastwards into savanna scrub woodlands (mainly Sour Lowveld Bushveld, Sweet Lowveld Bushveld and Lebombo Arid Mountain Bushveld).

Sources: Anonymous 2000, Braun & Dlamini 1994, Low & Rebelo 1998, Stuart & Adams 1990, White 1983

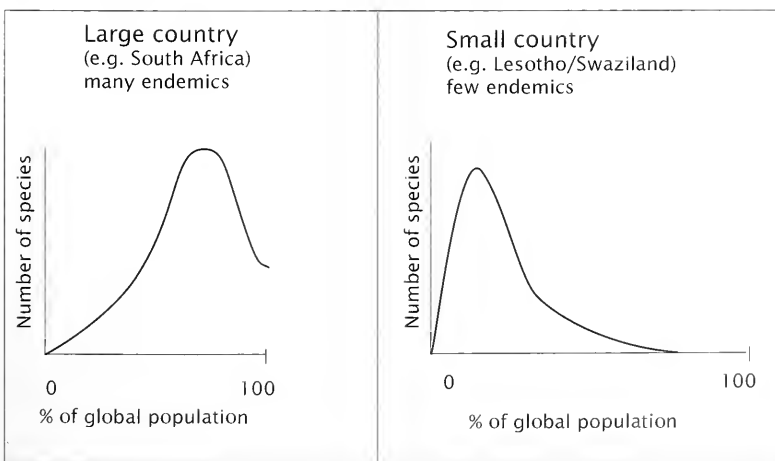


Figure 1. In a small country, most species tend to have a small share of the total global population of a species, whereas very few or none are endemic to the country (adapted from Gärdenfors *et al.* 1999).

*National Herbarium, Malkerns, Swaziland

Table 1. Number of taxa in each category on the Swaziland RDL.

RDL status	Number of taxa
Extinct (EX)	3
Extinct in the Wild (EXW)	1
Critically Endangered (CR)	15
Endangered (EN)	29
Vulnerable (VU)	18
Lower-Risk near threatened (LR-nt)	16
Lower-Risk least concern (LR-lc)	68
Data Deficient (DD)	155
Total	305

tion of fauna, but plants do enjoy a high level of protection in reserves. Much of the biodiversity is on Swazi Nation Land (under traditional leadership) and on Title Deed Land (under private ownership).

Methods

Hilton-Taylor's (1996a) work formed the basis for this RDL. Our objective was to subject the "1996 RDL taxa" to a wide audience for re-assessment, to integrate new data, and to evaluate the conservation status of additional species. In addition to information in Hilton-Taylor (1996a), herbarium specimen data from PRECIS, PRE, SDNH, and databases belonging to Kate Braun were used as complementary starting points for making raw estimates (see Golding & Smith 2001). Herbarium collections by Braun, Compton, Culverwell, Dlamini, Dyer, and Kemp, to name but a few, also provided useful data. As there are many undercollected areas in Swaziland, we also relied on field observations of workshop participants to supplement recorded information. Additional taxa for RDL assessments were sourced from recent Environmental Impact Assessment studies.

The working approach adopted for the compilation of this RDL was to bring together botanists who work across the country to enable them to share their experiences relating to field observations and gen-

eral botanical knowledge. Three workshops were held between September 2000 and March 2001.

During the first workshop, the participants were familiarised with the IUCN RDL system of categories and criteria (IUCN 1994) so that a common understanding of their application could be reached. The IUCN 1994 Categories and Criteria were used to assess the conservation status; principles by Gärdenfors *et al.* (1999) served as a guide for assigning RDL categories at a national level for a country as small as Swaziland. Compared to large-sized countries, small countries tend to hold a smaller proportion of the global distribution of species, and hence, are likely to have fewer species confined within its borders (Figure 1). Theoretically, this meant that virtually the entire flora of Swaziland could have been placed on the RDL based on a narrow distribution range. To prevent this, species with approximately 20% or less of their global range (or global population) within the political borders of Swaziland were excluded from the RDL assessment process. Exceptions were made in cases where a species was known to be utilised or of some charismatic value.

Results and Discussion

In total, 305 taxa appear on the RDL for Swaziland (Table 1). This is a very high

Table 3. Endemism on the Swaziland RDL.

Endemism	Number of taxa
Confirmed endemic	12
Suspected endemic	7
Confirmed near-endemic	35
Suspected near-endemic	5
Total	59

number of species, considering the size of the country.

Red Data List

Some 66 taxa (22%) that appear on the RDL are threatened (CR, EN, and VU). More than 50% have been categorised as *Data Deficient*; this clearly underlines the need for future work, particularly because some of the categories could not be used owing to the quantitative nature of their requirements (see Braun & Dlamini 1994). This lack of information is a result of the fact that the bulk of these assessments are based on herbarium collections and the degradation of localities, rather than on solid field evidence for the impacts of threatening processes on population decline. Herbarium data from PRECIS were sometimes found to be unreliable—often there were no records from Swaziland, or if there were, they were either single or poorly known. However, supplementing PRECIS information with other herbarium data sources held in Swaziland was very useful.

The main families represented on the RDL are the Apocynaceae, Asteraceae, Lamiaceae, and Asphodelaceae (Table 2). Most of these taxa are utilised for medicinal and ornamental purposes. The figures also reflect on how well-known these families are in terms of their representation in herbaria and the literature.

Another bias we encountered was the disparity between protected and unprotected areas. We found that the most reliable field records came from Malolotja and Mlawula Nature Reserves, and to a lesser extent, from other protected areas. Malalotja and Mlawula, which have a combined land area of 2% of the size of Swaziland, collectively contain 60% of all the species recorded in Swaziland (Braun & Dlamini 1994). The reason for this disparity is that more taxonomic and ecological studies have been carried out within protected areas than outside the protected area system.

Table 2. The ten families with the highest representation on the Swaziland RDL.

Family	Number of taxa
Apocynaceae <i>sensu lato</i>	31
Asteraceae	27
Lamiaceae	22
Asphodelaceae	21
Fabaceae	14
Orchidaceae	13
Iridaceae	12
Crassulaceae	10
Euphorbiaceae	10
Gesneriaceae	10

Moreover, most endemics and near-endemics come from the Swaziland border areas of the Lebombo Mountains (KwaZulu-Natal) and from Barberton (Mpumalanga), as well as elements of the Maputaland Centre of Endemism, which Swaziland shares with Mozambique and South Africa (KwaZulu-Natal). Kemp (1983) recognised only four country endemics for Swaziland, whereas Braun & Dlamini (1994) estimated that there are at least 25 species (Table 3). It is our view that true levels of endemism will only be determined through field surveys along the Swaziland border, particularly the Lebombo Mountains, and that this be coupled with taxonomic activities.

Threats

The following key threats to the flora of Swaziland are recognised, though they are not formally documented for the country:

- Destruction or alteration of habitats through infrastructural development (urbanisation) and vegetation-clearing for food crops (maize, sorghum, and beans).
- Invading exotic species such as *Lantana camara*, *Sesbania punicea*, and *Chromolaena odorata* displace indigenous species and certainly have an effect on RDL species. Unfortunately, the ecological impact of alien invaders on threatened species in Swaziland has not yet been scientifically studied.
- Increasing human settlement owing to population expansion.

Conservation Legislation

Recently, the country has established the Swaziland Environmental Authority, a national body responsible for overseeing environmental protection. There are several legal instruments that cater for conservation issues residing in different government departments, but most of these legal structures are outdated. The Government of Swaziland is revisiting legislation, and the Flora Protection Bill of 2000 has been signed by His Majesty the King and turned into law. The Flora Protection Act of 2001 lists 206 protected plant species.

The Swaziland RDL is expected to work hand in hand with these legal instruments, which are expected to safeguard plant biodiversity. The Swaziland Environmental Authority Act of 1992 stipulates that prior to commencement of major development projects an Environmental Impact Assessment (EIA) should be carried out

and proper mitigation measures should be guaranteed. The Act further calls for special attention to be given to plants of high conservation status in the EIA studies. This updated RDL will enable the enforcement of this requirement. Therefore, within the above-stated legal framework, Swaziland finds herself in a favourable position to enforce the RDL.

Conclusion

The RDL account presented here is far more comprehensive than previous attempts. This is a result of consultation with relevant stakeholders, who must be commended for their dedication and effort.

Owing to the dynamic nature of species losses, this work is not final and the RDL will certainly undergo future changes. However, we emphasise that this RDL is an additional and useful document for the

Flora Protection Act, as it will enable closer monitoring of Swaziland's flora. To make this a reality, formal field studies on plant community structures, population dynamics, and utilisation patterns of plant species of commercial value have to be carried out in future.

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Participants at the Red List workshop in Mbabane. (Photo: J.S. Golding)



Invasive alien encroachment constitutes a major threat to biodiversity in Swaziland. (Photo: J.S. Golding)

EXTINCT & THREATENED

ACANTHACEAE

Duvernoia aconitiflora A.Meeuse
Status: EN B1B2cD2

Threats: Urban expansion
Distribution: Ingwavuma Gorge (Lebombo District)
Could be in forest or grassland. The closest locality to Swaziland is in the southern highveld in South Africa, some 100 km away. High human population growth in the area constitutes a threat.

ALOACEAE

Aloe albida Stapf

Status: EN B1B2cde
Endemism: Near-endemic

Distribution: Malolotja, Pigg's Peak
Tips into Swaziland from the Borberton area in South Africa. Borberton is the type locality. Apparently only one locality outside Swaziland.

Aloe chortolirioides A.Berger var. *chortolirioides*

Aloe chortolirioides A.Berger var. *baastii* (Letty) Reynolds
Status: EN B1B2abc2a
Distribution: Bulembu area, Barberton Mountains, Malolotja, Hawane Waterfall, Pigg's Peak (gold mine)
On rocky open outcrops. Is a fire-dependent species. Was listed as Rare for Swaziland in previous RDLs. The red form is found in the Bulembu area. Common between Bulembu (Swaziland) and Barberton Mountains (South Africa). Generally known from Limpopo Province and Mpumalanga in South Africa.

Aloe dewettii Reynolds

Status: EN A1acd
Threats: Collection
Distribution: Hlatikulu (Grand Valley)
Listed by WCMC's RDL as Vulnerable for Swaziland and previously Rare. Previously found in the Hlatikulu (1970s), but could not be found there recently. Is a spotted-leaf *aloe* eaten by people. Threatened by a high population density.

Aloe ecklonis Salm-Dyck

Aloe kraussii Baker; *Aloe baylei* Baker
Status: VU B1B2cD2
Distribution: Malolotja area, Forbes Reef, between Motjane and Oshoek
Tips into Swaziland. Mainly a South African distribution. Very common and widespread in South Africa.

Aloe kniphofioides Baker

Status: VU A2cB1B2c
Threats: Collection, harvesting, grazing, fire, urban expansion
Distribution: Malolotja, Forbes Reef, Nyonyane Sisa Ranch, Bulembu, Mbabane, Mankayane
Gross *aloe*. Common in Malolotja. Not protected in Forbes Reef. Used in Nyonyane Sisa. Medicinal usage, cattle and resettlement are further threats. Widespread in South Africa.

Aloe minima Baker var. *minima*

Aloe minima Baker var. *blyderivierensis* (Groenew.) Reynolds;
Aloe parviflora Baker
Status: VU A1cB1B2bD1
Endemism: Near-endemic?
Threats: Road network
Distribution: Forbes Reef, Malolotja, Ngwenya, Motjane
Scattered. Very small and inconspicuous. In previous RDLs, considered Rare in Swaziland. Very common in South Africa (Limpopo Province and Mpumalanga).

AMARYLLIDACEAE

Cyrtanthus nutans R.A.Dyer

Status: EN A1c
Threats: Damming
Distribution: Komati Bridge, Magway Farm area, between Pigg's Peak and Mbabane

Haemanthus paucilifolius Snijman & A.E.van Wyk
Status: VU C2bD2

Endemism: Near-endemic
Threats: Damming, grazing
Distribution: Magway
Found along the Komati River. Recently discovered in Swaziland from only one locality. In South Africa, it is known from only a few localities in fairly close proximity to the Swaziland border.

ANACARDIACEAE

Lannea antiscorbutica (Hiern) Engl.

Status: EN DB1B2aC2b
Endemism: Near-endemic
Distribution: Umbeluzi Gorge (Mlawula)
Previously only known from a single locality in South Africa near the Swaziland-Mozambique border.

APOCYNACEAE

Adenium multiflorum Klotzsch

Status: EN A2cdB1B2abcC1
Threats: Agriculture
Distribution: Near Tambuthi, Big Bend
Very restricted in Swaziland. One large scattered subpopulation. Sugarcone forming and lower *Usuthu* development are threats. Well represented outside Swaziland. The species nomenclature is not always recognised or in use in other countries.

Adenium swazicum Stapf

Status: EN A1acdB1B2abcd
Endemism: Near-endemic
Threats: Agriculture, damming, collection, alien plant infestation, habitat degradation
Distribution: West of Lebombo, Big Bend area and northwards
Thorny thicket on brookish plains. This succulent is protected by legislation. Its habitat is also very fragmented. Distribution mainly from north of Komatiport in South Africa to Big Bend in Swaziland. The main threat is urban development.

ASCLEPIADACEAE

Asclepias eminens (Harv.) Schltr.

Status: VU B1B2cD2
Threats: Grazing, soil erosion, fire
Distribution: Mpisi, Malkerns, St. Josephs, Hlatikulu, Manzini
A widely scattered but uncommon species. In Zimbabwe it is a distinct ecotype. Edible plant.

Brachystelma coddii R.A.Dyer

Status: EN B1B2cC2aD
Distribution: Malolotja, Bomvu Ridge, Mbabane, Pigg's Peak
Three records in Swaziland, including from a protected area, by Compton, Brown and Kemp.

Brachystelma swazicum R.A.Dyer

Status: EX?
Endemism: Near-endemic?
Distribution: Rocky hills northeast of Mbabane, (Malandzela Area, on the road to Maphaleni)

Known from two records in Swaziland by Compton and Kemp in Mbabane.

Ceropegia cimiciodora Oberm.

Status: EN B1B2c
Threats: Grazing
Distribution: Ingwavuma Poort
Restricted distribution. In a previous RDL, it is considered Endangered in South Africa's former Transvaal. Found in a restricted area. Grazing by cattle is a threat.

Orbeopsis gerstneri (Letty) L.C.Leach subsp. *gerstneri*

Status: EN B1B2c
Endemism: Endemic
Threats: Habitat degradation, grazing
Distribution: Ingwavuma Poort
One subpopulation said to be in Swaziland, but further taxonomic scrutiny is required. Partial habitat decline induced by cattle grazing is a threat.

Pachycarpus stelliceps N.E.Br.

Status: EX
Endemism: Endemic
Distribution: Mbabane
Only known from the type collection made near Mbabane. Reported to be extinct.

ASPHODELACEAE

Kniphofia tysonii Baker subsp. *lebomboensis* Codd

Status: CR A2B1B2bceC1C2b
Endemism: Near-endemic
Threats: Collection, alien plant infestation, road network
Distribution: Lebombo (South of Stegi)
Grew in a pan, but a road has been developed near the locality. High density area. Used for its medicinal properties. Reported to occur in South Africa.

Kniphofia umbrina Codd

Status: CR B1B2ce
Endemism: Near-endemic
Threats: Habitat degradation
Distribution: Mbabane, Forbes Reef, Hwane
Confined to small area near Mbabane. Only eight very small subpopulations are known. It is highly fragmented and declining due to habitat destruction.

ASTERACEAE

Aster pseudobakeranus Lippert

Status: VU D2
Endemism: Endemic
Distribution: Poliniene River, Ukuthula (Mbabane Division), Verdun (Hlatikulu Division)
Restricted distribution.

Helichrysum milleri Hilliard

Status: VU D2
Endemism: Near-endemic
Distribution: Barberton Mountains
On forest margins in grassland. Known mainly from the Barberton mountains in South Africa.

CANELLACEAE

Warburgia salutaris (Bertol.f.) Chiov.

Status: CR A1bcd
Threats: Collection
Distribution: Malolotja, possibly in Lomati Valley
Only six trees observed outside protected areas in Swaziland (as reported by conservation authorities in Swaziland). Very few individuals in protected areas, but these are regenerating and are currently not being utilised.

CAPPARACEAE

Bachmannia woodii (Oliv.) Gilg
Status: CR B1B2cC2a
Distribution: Jilobi
Only one record for this species in Swaziland.

CARYOPHYLLACEAE

Dianthus moiensis F.N.Williams subsp. *kirkii* (Burt Davy) Hooper
Status: VU C1C2a
Threats: Collection
Distribution: Malolotja, Piggs Peak, Usuthu, Maguga Dam
In South Africa, found in the Magaliesberg and Witwatersrand (possibly declining over much of its range). Has horticultural potential. In Swaziland, it is used to make the royal saap for the King. The Swaziland subpopulations are scattered and locally rare. Utilisation is a serious threat.

CRASSULACEAE

Crassula vaginata Eckl. & Zeyh. subsp. *minuta* Eckl. & Zeyh.
Status: CR A1cB1B2ab
Endemism: Near-endemic
Threats: Urban expansion, habitat degradation
Distribution: North of Mbabane (possibly Nkwalini landfill site)
Found on rocky granite hills. Could be extirpated in the next five to ten years. Landfill site is a serious threat to locality, seriously threatened. The species is known only from this site in Swaziland.

ERICACEAE

Erica swaziensis E.G.H.Oliv.
Status: EN B1B2aD
Endemism: Endemic
Distribution: Mbabane, Forbes Reef, Black Umbeluzi Valley
Hos a very localised distribution around Mbabane. Wetland species.

EUPHORBIACEAE

Euphorbia keithii R.A.Dyer
Status: CR B1B2cC2a
Endemism: Near-endemic
Threats: Agriculture, urban expansion, habitat degradation, forestry exploitation, harvesting, alien plant infestation
Distribution: Stegi, Usuthu Gorge (?), Sitsatsaweni (northeast of Siteki), Oribi Ranch, Mlawula
Species protected under CITES. Habitat specific, habitat decline. Species prefers hot, dry, exposed areas. Restricted to the Lebombo Mountains.

Heywoodia lucens Sim
Status: EN B1B2cC2aD
Distribution: Jilobi, Siteki
Recorded in Swaziland by Kemp and Miller.

GESNERIACEAE

Streptocarpus confusus Hilliard subsp. *confusus* var. *confusus*
Status: EN A1cB1B2bc
Endemism: Near-endemic
Threats: Grazing
Distribution: Hlatikulu
Restricted global distribution. Cattle is a threat.

Streptocarpus daviesii N.E.Br. ex C.B.Clarke
Status: EN B1B2b
Endemism: Near-endemic

Threats: Urban expansion, habitat degradation
Distribution: Mbabane hills
Restricted global distribution. Known only from a single locality in Swaziland.

Streptocarpus davyi S.Moore
Status: VU B1B2bD2
Endemism: Endemic
Threats: Urban expansion, habitat degradation
Distribution: 40 km around Mbabane (hills), near Mankaiana, Forbes Reef, Makhosini Hills, Makhaya
On peaty soil on granite outcrops and is fragmented. Known from a number of localities but it is not widespread. Habitat specific in shade and soil. It is uncommon.

Streptocarpus wilmsii Engl.
Status: VU B1B2c
Endemism: Near-endemic
Threats: Urban expansion
Distribution: Devils Bridge, Kings Forest, Mbabane, Hilltop, Ukuthula

HYACINTHACEAE

Bowiea volubilis Harv. ex Hook.f.
Status: EN A1d
Threats: Collection
Being severely depleted in Swaziland. Many extinct localities. Used for treating fractures (medicinal). Very common on market places. Known from outside Swaziland. Also heavily utilised in South Africa.

IRIDACEAE

Dierama elatum N.E.Br.
Status: EX
Known only from the type collection of 1910 (Stewart 10 K & SAM). Material inadequate, and it may possibly be a hybrid or an albino form (taxonomy uncertain).

Gladiolus brachyphyllus F.Bolus
Status: VU A2c
Threats: Urban expansion
Distribution: Umbeluzi and Umlola Reserves, Mlawula
Several subpopulations found in the Kruger National Park (South Africa); recorded from Limpopo Province and Mpumalanga (South Africa). Only single plants have been found in Swaziland. Very seldomly seen.

LAMIACEAE

Hemizygia stalmansii Paton
Status: VU D2
Endemism: Near-endemic
Threats: Afforestation
Distribution: Luhumannei School
Recently described species known only from Sangimvelo (South Africa) and Swaziland (Malalotja). Occurs on Barberton Belt and known from different soil types, including serpentine soils. Few localities are known and it has a restricted global distribution.

Syncolostemon comptonii Codd
Status: CR A1cB1B2a
Endemism: Endemic
Threats: Damming
Distribution: Malalotja, Maguga
Threatened by construction of a new dam at Mogogo. The species is known from only a single locality.

MORACEAE

Ficus polita Vahl subsp. *polita*
Status: VU D2
Distribution: Mlawula (Umbeluzi Gorge, Mahlabashane), Jilobi

Ficus sansibarica Warb.
Status: CR B1B2cC2a
Distribution: Sihoya

ORCHIDACEAE

Cheirostylis gymnochiloides (Ridl.) Rchb.f.
Status: CR B1B2cC2b
Threats: Mining
Distribution: Bomvu Ridge (Ngwenya Mountain—Malalotja)
Appears to be extremely rare everywhere. There is apparently only a single collection from Swaziland. Also known from dune forest in South Africa, and as far afield as Tanzania and Madagascar. Flowers from August to September. Iran are mining is a threat in Swaziland.

Disa intermedia H.P.Linder
Status: EN B1B2cC2a
Endemism: Endemic
Threats: Habitat degradation
Distribution: Forbes Reef, near Mbabane, Malalotja, near Oshaok
Grows at an altitude of 1,000 m. Was considered to be common at one time, but due to continued habitat destruction, it is rapidly declining. Flowers in January. Found in highveld grassland.

Eulophia chlorantha Schltr.
Status: EN B1B2cC2a
Endemism: Near-endemic
Distribution: Mbabane, Waverley Mine, Fanteyn
Restricted distribution.

PROTEACEAE

Protea comptonii Beard
Status: EN B1B2cD
Endemism: Near-endemic?
Distribution: Bulembu, Malalotja
One outlying subpopulation in KwaZulu-Natal (South Africa), although more common in northern and northeastern parts of South Africa.

Protea parvula Beard
Status: VU B1B2cC2a
Distribution: Timbuti Farm, Hawane, Malalotja
Common in the former Transvaal of South Africa.

ROSACEAE

Prunus africana (Hook.f.) Kalkman
Status: EN C2aD
Distribution: Near Malalotja (Forbes Reef), near and in Mbabane
Also known from South Africa (KwaZulu-Natal) and further afield. Is widely utilised for its medicinal purposes.

RUBIACEAE

Gardenia thunbergia L.f.
Status: CR C2b
Threats: Deforestation
Distribution: Jilobi Forest (Lebombo)
This species is very well represented outside Swaziland, common in coastal areas from as far afield as the Eastern Cape in South Africa. Only a few individuals seen. Known from a small subpopulation.

Oxyanthus pyriformis (Hochst.) Skeels subsp. *pyriformis*
Oxyanthus natalensis Sond.
Status: EN B1B2cD
Endemism: Near-endemic
Distribution: Jilobi (Lebombo), Carmichael's Farm
The species is at the end of its distribution range in Swaziland, better known from KwaZulu-Natal (South Africa). The two known localities in Swaziland are quite a distance apart. Dune forest.

SAPINDACEAE

Allophylus chaunostachys Gilg

Status: VU B1B2c

Endemism: Near-endemic

Threats: Urban expansion

Distribution: Makwongwa

Found at altitude 1,730 m. Reported to be common.

Human impact near border post is a threat.

SAPOTACEAE

Vitellariopsis dispar (N.E.Br.) Aubrév.

Status: EN B1B2CD

Endemism: Near-endemic

Distribution: Mlawula, Siteki

Restricted. Only one locality outside Swaziland. Moist forest.

SCROPHULARIACEAE

Melanospermum italae Hilliard

Status: EN B1B2C2a

Endemism: Near-endemic

Distribution: Malolotja (Ngwenya Hills), Motjane

On sandy places around rock sheets. In South Africa, it is known from the Piet Retief area and Itala.

Melanospermum swazicum Hilliard

Status: EN B1B2aC2a

Endemism: Near-endemic

Threats: Fire, grazing, habitat degradation

Distribution: Mbabane, Malolotja, possibly Ngome, Siphocasini

Grows on hills. Subpopulation at Ngome may be a different species. Only one locality known outside Swaziland.

Selago swaziensis Rolfe

Status: EN B1B2aC2a

Endemism: Near-endemic

Threats: Urban expansion, fire

Distribution: Hills near Dalriach (Mbabane), Usuthu

Forest, Miller's Falls, Makhosini Hills, Ukuthula

Known only from a single, highly threatened locality.

ULMACEAE

Celtis gomphophylla Baker

Status: EN D B1 B2c C2a

Distribution: Jilobi, Carmichael's Farm, Muti Muti

More common than *Celtis mildbraedii*. Only in South Africa according to PRECIS.

Celtis mildbraedii Engl.

Status: CR B1B2C2a

Distribution: Mlawula, Jilobi (east of Siteki), Farbes

Reef

Very rare in South Africa's KwaZulu-Natal and elsewhere.

Known from a few small forest patches in Swaziland.

VELLOZIACEAE

Xerophyta villosa (Baker) L.B.Sm. & Ayensu

Status: VU D2

Distribution: Luhumannei School (Malalotja)

Found on serpentine soils in Swaziland.

ZAMIACEAE

Encephalartos aplanatus Vorster

Status: EN A1acdB2abcde

Distribution: Mlawula, Gaba road just north of Siteki,

South of Siteki toward the farm Muti-Muti, previously on Muti-Muti

This species is also known from Mozambique. This species was described from a subpopulation of about six individuals near the Swaziland-South Africa border.

Subsequently, several subpopulations have been discovered. Threatened by illegal collectors.

Encephalartos heenanii R.A.Dyer

Status: CR A1acdC2a

Threats: Collection

Distribution: Ngwenya Ridge, Malalotja

In 1985, 100 plants were counted. In 1999, only 20 plants could be located. These plants are known from a locality where no recruitment seems to be taking place.

A few years ago, this species was also found in a protected area in Swaziland but in very small numbers.

Also known from South Africa. Threatened by illegal collectors.

Encephalartos laevifolius Stapf & Burtt Davy

Status: CR A2deB2bd

Threats: Pest/disease

Distribution: Malalotja

In Swaziland, the effects of a pathogen are evident.

Threatened by illegal collectors.

Encephalartos lebomboensis I.Verd.

Status: EN A1acdeA2deB1B2abcde

Threats: Harvesting, collection

Distribution: Mangana, Mbuzini, Malta Alta, Lebambo, Stataweni, Mangana

All the localities mentioned are primarily relicts.

Subpopulations suffered a measurable decline. In 1981, the subpopulation was observed to be abundant. Almost 20 years later, there has been a 25% decline.

Threatened by illegal collectors.

Encephalartos ngoyanus I.Verd.

Status: CR C2ad

In Swaziland, it is known from a single locality as the distribution literally tips into Swaziland. The locality is not threatened, and no people live in that area. May become threatened by illegal collectors.

Encephalartos paucidentatus Stapf & Burtt Davy

Status: VU A1cdC2aD2

Distribution: Makonwya, Malolotja

Found in a protected area. The species is found along the Swaziland-South African border. Also known from South Africa where it is threatened. Threatened by illegal collectors.

Encephalartos relictus Hurter

Status: EXW

Endemism: Endemic

Distribution: Malto Alto (10 km west), Muti-Muti farm. It is now known only in cultivation.

Encephalartos senticosus Vorster

Status: VU C2ad2

Distribution: Lebombo, Usuthu, Bvane catchment

Extremely inaccessible habitat. The species is found along the Lebombo border. Threatened by illegal collectors.

Encephalartos umbeluziensis R.A.Dyer

Status: CR A1acdA2cB1B2abcde

Threats: Collection

Distribution: Umbeluzi Gorge of Mlawula

Occurs in the shade of *Androstachys johnsonii* forest. This species used to be extremely common, but this has changed. The species has suffered massive decline in the last 10 years, estimated at more than 80%. It is found in an extremely accessible area. Threatened by illegal collectors.

ZINGIBERACEAE

Siphonochilus aethiopicus (Schweinf.) B.L.Burtt

Kaempferia aethiopica (Schweinf.) Benth.; *Kaempferia natalensis* (J.M.Wood & Franks) Schltr. & K.Schum.

Status: EN A1d

Threats: Collection

Distribution: Malolotja, Balegane, Komati Valley, Pigg's Peak

Generally heavily utilised everywhere. Was on the previous Swaziland RDL as Rare. The Malalotja subpopulation is well-known and utilised by local herbalists, even though it is located within a protected area. There are unconfirmed reports that several subpopulations are protected from over-utilisation through traditional laws, but this cannot be confirmed. Well-represented outside Swaziland.



Siphonochilus aethiopicus, also occurring in South Africa and Mozambique, is a well known species that is heavily utilised in Swaziland. (Photo: NBI)

LOWER RISK

ACANTHACEAE

Thunbergia pondoensis Lindau

Status: LR-lc

Distribution: Mlawula, Komati Bridge

ALOACEAE

Aloe cooperi Baker subsp. *pulchra* Glen & D.S.Hardy

Status: LR-lc

Threats: Grazing, alien plant infestation, harvesting
Distribution: Lebombo, Nkambeni, Sishaweni Forest Company

Taxonomically unique and this nomenclature is used in Swaziland. Known from the Lebombo where it is rare. It is widespread. Eaten by people.

Aloe rupestris Baker.

Status: LR-lc

Distribution: Umbeluzi Gorge, Mnyame, Libertas, Lebombo

Was listed previously as Rare for Swaziland.

Aloe vanbalenii Pillans

Status: LR-lc

Distribution: Mlawula, lower East side of Umbeluzi river, Lebombo

In river valleys. Uncommon. Was listed as Rare for Swaziland in previous RDLs. Only in the northern Lebombo Mountains.

AMARYLLIDACEAE

Clivia miniata (Lindl.) Regel var. *miniata*

Status: LR-nt

Distribution: Lebombo, Piggs Peak area

Forest species. Well-known from South Africa. Is being removed from the wild.

Crinum delagoense I.Verd.

Status: LR-lc

Threats: Agriculture

Distribution: Mlawula, Hlane (Simunye)

One subpopulation known. Only in South Africa, according to PRECIS. Sugar cultivation is a threat.

Cyrtanthus bicolor R.A.Dyer

Status: LR-lc

Threats: Collection

Distribution: Malolotja, Umbeluzi Valley, Mbabane (Umbeluzi Valley), Forbes Reef, Komati River Valley
Was on the previous Swaziland RDL as Rare. Found in grassland. Eaten as a vegetable.

Nerine angustifolia (Baker) Baker

Status: LR-lc

Distribution: Ngwenya Mts, Forbes Reef Road, Malolotja

Recorded in Swaziland by Campton and Braun.

ANACARDIACEAE

Rhus grandidens Harv. ex Engl.

Status: LR-lc

Distribution: Komati Valley, Ngamini, Mayami, Mankayane, 25 km North of Tulwane site

On forest margins. Although widespread, it is never plentiful.

ANNONACEAE

Uvaria lucida Benth. subsp. *virens* (N.E.Br.)

Verdc.

Status: LR-lc

Distribution: Lebombo, Mlawula

Xylopia odoratissima Welw. ex Oliv.

Status: LR-lc

Distribution: Umbeluzi Gorge, Mhlumeni Border

ANTHERICACEAE

Chlorophytum haygarthii J.M.Wood & M.S.Evans

Status: LR-lc

Distribution: Forbes Reef Road, Malolotja

At least two records from Swaziland by Compton and Heath. Common in Mpumolanga and KwaZulu-Natal (South Africa).

APIACEAE

Alepidea parva Compton

Status: LR-lc

Threats: Collection, mining

Distribution: Ngwenya Mountains near Mbabane, Malolotja

Reported to be threatened outside Swaziland. Used for its medicinal properties.

APOCYNACEAE

Gonioma kamassi E.Mey.

Status: LR-nt

Distribution: Mbabane, Msunduzi, Foot of Lubor

In forest. Common in the eastern and southern Cape forests of South Africa. Probably not used and therefore maybe not threatened. Single trees. Unusual distribution, not common in Swaziland. Frequently burnt. Very disjunct.

ARALIACEAE

Cussonia nicholsonii Strey

Status: LR-lc

Distribution: Mlawula (S), Siteki

Two records, one in a protected area. Known collections in Swaziland by Culverwell and Kemp.

ASCLEPIADACEAE

Orbea paradoxa (I.Verd.) L.C.Leach

Orbeanthus paradoxa (I.Verd.) L.C.Leach

Status: LR-nt

Threats: Mining

Distribution: Ngwenya

Listed as Endangered in South Africa's former Transvaal in previous RDLs.

Pachycarpus galpinii (Schltr.) N.E.Br.

Status: LR-lc

Threats: Agriculture, grazing

Distribution: Barberton Mountains, Mbabane, Usuthu, Forbes Reef, Maphaleni

This is essentially a highveld species. Cattle is a serious threat.

Pachycymbium ubomboense (I.Verd.) M.G.Gilbert

Coralluma ubomboensis I.Verd.

Status: LR-lc

Endemism: Endemic?

Distribution: Lebombo

Was listed previously as Rare for Swaziland. Is common in the Lebombo Mountains.

ASPHODELACEAE

Bulbine inflata Oberm.

Status: LR-lc

Distribution: Manzini, Mbabane, Usuthu, Malolotja, Bulembu

Gasteria batesiana G.D.Rowley

Status: LR-nt

Threats: Collection

Distribution: Umbeluzi Gorge, Mnyami

On cliffs. Four small disjunct subpopulations in Swaziland. Collected for medicinal and horticultural purposes.

Haworthia limifolia Marloth var. *ubomboensis* (I.Verd.) G.G.Sm.

Status: LR-nt

Endemism: Near-endemic

Threats: Collection

Distribution: Siteki, Umbeluzi Gorge, Mnyame

In forests. Limited in distribution. Not uncommon. Known from two subpopulations in Swaziland, but restricted to the Lebombo. Known only from Ironwood forests. Collected for medicinal and horticultural purposes. Also reported from the Lebombo in South Africa and Mozambique.

ASTERACEAE

Eumorphia swaziensis Compton

Status: LR-nt

Endemism: Endemic?

Threats: Urban expansion

Distribution: Mbabane District, Black Umbeluzi Valley
Very restricted and suggested that it could be threatened. Several hundred individuals. On the edge of an urban/semi-urban environment. Should be monitored. Possibly also occurs in South Africa.

Newtonia hildebrandtii (Vatke) Torre

Status: LR-lc

Distribution: Mlawula, Manzimnyama (Nyame),

Umbeluzi Gorge, Black Mbeluzi River

Recorded in Swaziland by Culverwell.

Senecio mlilwanensis Compton

Status: LR-nt

Endemism: Endemic

Distribution: Mbeluzi Valley, Millers Falls, Mbabane and Mlilwane, Mantenga?

Rocky outcrops. In Swaziland, mostly prevalent on private land. Also found at Montengo where it is partially protected.

BEGONIACEAE

Begonia sonderana Irmsch.

Status: LR-lc

CAPPARACEAE

Cleome macrophylla (Klotzsch) Briq. var. *macrophylla*

Status: LR-lc

Distribution: Mlawula (Lebombo), Mbeluzi Gorge

COMMELINACEAE

Aneilema dregeanum Kunth

Status: LR-lc

Distribution: Ingwavuma Poort, Mtindekwa, Mlawula

Three localities identified in Swaziland from collections

by Compton and Braun. Also known from South Africa, and reported also to occur in Zimbabwe.

CRASSULACEAE

Cotyledon orbiculata L. var. *oblonga* (Haw.) DC.

Status: LR-1c

Distribution: Mlawula

A widespread and common species (well represented outside Swaziland). The Swaziland specimen may be a misidentification (taxonomic problem). If this is a good identification, then the species has a very restricted distribution.

Crassula acinactiformis Schinz

Status: LR-1c

Distribution: Ukuthula, Hlatikhulu, Komati Bridge, Mlawula, Maguga, Siteki, Umbeluzi Gorge
One protected locality.

Crassula orbicularis L.

Status: LR-1c

Only one record for Swaziland by Kemp.

CYATHEACEAE

Cyathea capensis (L.f.) Sm.

Status: LR-1c

Limited habitat. Very well represented outside Swaziland.

DIPSACACEAE

Cephalaria petiolata Compton

Cephalaria pungens Szaib

Status: LR-1c

Distribution: Malolotja, Forbes Reef Road
One of the four records in a protected area. The synonym is not used in Swaziland. It is common outside Swaziland.

EBENACEAE

Diospyros galpinii (Hiern) De Winter

Status: LR-1c

Distribution: Mankayane, Maphalaleni, Miller, Mantenga
Highveld grassland species.

ERICACEAE

Erica cerinthoides L. var. *barbertonia* (Galpin)

Bolus

Status: LR-1c

Distribution: Malolotja, Waverley Mine, mHangamphepha Valley, Pigg's Peak

Two records in Malolotja by Compton and Braun.

Erica oatesii Rolfe var. *latifolia* Bolus

Status: LR-nt

Endemism: Near-endemic?

Distribution: Usuthu, on the road to Hlatikhulu
Limited distribution. Said to be rare. Possibly a taxonomic problem.

EUPHORBIACEAE

Croton madandensis S.Moore

Status: LR-1c

Distribution: Mlawula, Lebombo Mountains
Shrub or tree.

Drypetes mossambicensis Hutch.

Status: LR-1c

Distribution: Umbeluzi Gorge (Mlawula)
Known only from a southern locality in Swaziland which is relatively safe. Known to occur outside Swaziland, where it is common.

Euphorbia clavigera N.E.Br.

Status: LR-1c

Endemism: Endemic?

Threats: Grazing

Distribution: Manzini area, Siteki, Siphofaneni, Manzini

Wild-collected plants are known from cultivation. Easy to grow from seed, attractive species. Restricted distribution.

Euphorbia grandicornis Goebel ex N.E.Br. subsp.

grandicornis

Status: LR-1c

Distribution: Chindene, Big Bend

Very common where it occurs. Also in Ndumo, South Africa.

Margaritaria discoidea (Baill.) G.L.Webster

Status: LR-1c

Distribution: Mlawula

Observed in the wild several times.

FLACOURTIACEAE

Scopia oreophila (Sleumer) Killick

Status: LR-1c

Threats: Agriculture, deforestation, afforestation

Distribution: Manzini, Shiselweni, on Mkonzo River

In Swaziland, its main centre is on the Mkonzo River.

Its habitat appears to be stable. The threats are not resulting in any real declines. In future lack of suitable habitat may play a role. Subsistence farming is a threat.

GESNERIACEAE

Streptocarpus confusus Hilliard subsp.

lebomboensis Hilliard & B.L.Burtt

Status: LR-1c

Endemism: Near-endemic

Distribution: Mlawula, Mnyame, Jilobi

Scattered in moist forest of the Lebombo.

Streptocarpus dunni Hook.f.

Status: LR-1c

Distribution: Mbabane, Forbes Reef, Motjane,

Gobolondo, Pigg's Peak, Malolotja

Narrow distribution. Mainly known from the Borberton area in South Africa. Habitat specific on granite.

Streptocarpus micranthus C.B.Clarke

Status: LR-1c

Threats: Grazing, mining

Distribution: Kings Forest, Devils Bridge

Restricted distribution. The species occurs in a protected area in Swaziland. However, it does not appear in PRECIS.

HETEROPYXIDACEAE

Heteropyxis canescens Oliv.

Status: LR-1c

Distribution: Malolotja, Mbabane, Black Umbeluzi Valley, Palwane Valley

Was considered previously to be rare in Swaziland. Common in Malolotja.

HYACINTHACEAE

Drimiopsis maculata Lindl.

Status: LR-1c

Distribution: Mlawula, Red Tiger Ranch

Scilla natalensis Planch.

Status: LR-nt

Threats: Collection

Distribution: Malolotja, Usuthu, Mbabane

Widespread. Suggested to be classified as Vulnerable. Widely used and still abundant. In remote places it is frequent. Collected for medicinal purposes.

IRIDACEAE

Dierama mobile Hilliard

Status: LR-nt

Threats: Habitat degradation

Distribution: Oshoek, 15 km North of Forbes Reef, Komati River, Malandzela

Found in Swaziland and South Africa. Fairly widespread. Wetland species.

Diets flavida Oberm.

Status: LR-1c

Distribution: Malolotja and Mlawula Reserves, Lebombo

Has a disjunct distribution and occurs everywhere.

Watsonia bella N.E.Br. ex Goldblatt

Status: LR-1c

Threats: Grazing, fire

Distribution: Malolotja, Hlatikhulu, Forbes Reef, Mbabane, 5 km NE of Motjane, Malolotja

In Swaziland, grazing by cattle is a threat. Common in South Africa.

LAMIACEAE

Acrotome thorncroftii Skan

Status: LR-1c

Distribution: Mlawula, Lomahasha, Tulwana, Blue Jay Ranch

Previously listed as rare. Known from about five herbarium collections in Swaziland.

Hemizygia albiflora (N.E.Br.) M.Ashby

Status: LR-1c

Distribution: Ngwenya Mountains

Known from collections in Swaziland by Compton and Dlamini.

Hemizygia modesta Codd

Status: LR-1c

Distribution: Bomvu Ridge, Havelock, Gege, Forbes Reef

Recorded in Swaziland by Compton.

Orthosiphon vernalis Codd

Status: LR-nt

Endemism: Endemic

Distribution: Manzini, Mankaiana, Bhunya area, Evelyn Biring Bridge

Syncolostemon concinnus N.E.Br.

Status: LR-1c

Distribution: Malolotja, Mankayane, Hlatikhulu

Thorncroftia longiflora N.E.Br.

Status: LR-1c

Endemism: Near-endemic

Distribution: Malolotja

Common in Malolotja.

Tinnea barbata Vollesen

Status: LR-1c

Distribution: Wyldesdale, Malolotja

Recorded in Swaziland by Compton, Heath and Braun.

Tinnea galpinii Briq.

Status: LR-1c

Distribution: Hlatikhulu, Mlawula, Siteki, Cecil Marks Pass

Recorded in Swaziland by Compton and Culverwell.

LEGUMINOSAE: PAPILIONOIDEAE

Cordyla africana Lour.

Status: LR-1c

Very rare and marginal in Swaziland, often occurring as single plants. It is a widespread tropical plant. Wild Mango.

Eriosema ellipticifolium Schinz
Status: LR-lc
 Distribution: Malolotja, Malandzela, Mbabane
One record in Swaziland by Heath.

Eriosema transvaalense C.H.Stirt.
Status: LR-nt
 Threats: Damming
 Distribution: Malolotja, Maguga
Hos a globally restricted distribution.

Tephrosia cordata Hutch. & Burt Davy
Status: LR-lc
 Distribution: Malolotja, Havelock, Mbabane

Tephrosia gobensis Brummitt
Status: LR-lc
 Endemism: Endemic?
 Distribution: Mlawula, Siteki

Tephrosia grandiflora (Aiton) Pers.
Status: LR-lc
 Distribution: Blue Jay Ranch (Mlawula), Mananga Mount, Siteki
Recorded in Swaziland by Compton.

Tephrosia kraussiana Meisn.
Status: LR-lc
 Distribution: Mlawula
Known from collections in Swaziland by Culverwell.

LOBELIACEAE

Cyphia bolusii E.Phillips
Status: LR-lc
 Distribution: Mbabane (3 pops), Dalrich, Mbabane, Emlembe, Malkerns
On serpentine soils.

Lobelia corniculata Thulin
Status: LR-lc
 Distribution: Lebombo, Siteki, Mlawula
Was listed as Indeterminate/Uncertain in previous RDLs. Known from very few herbarium collections.

LYTHRACEAE

Nesaea alata Immelman
Status: LR-lc
 Distribution: Mlawula
In or near shallow pans. Only recorded twice, once from Kruger National Park (South Africa) and once in the Lebombo Mountains.

MORACEAE

Ficus bubu Warb.
Status: LR-lc
 Distribution: Mlawula, Manzinyama, Umbeluzi Poort, Siteki, Sihaya
In Androstachys forests in Mlawula.

OLEACEAE

Chionanthus foveolatus (E.Mey.) Stearn subsp. *foveolatus*
Status: LR-lc
 Distribution: Mlawula, Jilobi, Umbeluzi Gorge
Known from only a single protected locality in Swaziland.

ORCHIDACEAE

Disa extinctoria Rehb.f.
Status: LR-nt
 Distribution: Unspecified locality in Swaziland
Rare, occurs in damp grassland and swamps at an altitude of 1,000–1,300 m. Flowers from December to

January. Also known from the former Transvaal in South Africa. Its status in previous RDLs is Indeterminate.

Disa stachyoides Rehb.f.
Monadenia leydenburgensis Kraenzl.
Status: LR-lc
 Distribution: Mlembe, Malolotja
Widespread in many parts of South Africa. Also reported in Lesotho.

Polystachya albenscens Ridl. subsp. *imbricata* (Rolfe) Summerh.
Status: LR-nt
 Threats: Afforestation, grazing
 Distribution: Gobholo
Recently found in southern KwaZulu-Natal forests of South Africa. A sewerage plant in Swaziland may pose a threat.

Polystachya zuluensis L.Bolus
Status: LR-nt
 Endemism: Near-endemic
 Distribution: Usuthu Forest, Mzimba Mnts., Mbabane North
In rocky highveld areas, abundant, on Xerophyta. Locally common.

Schizochilus cecilii Rolfe subsp. *culveri* (Schltr.) H.P.Linder
Status: LR-nt
 Endemism: Near-endemic
 Distribution: NW Swaziland, Malolotja
Confined to the mountains between Borberton (South Africa) and northwestern Swaziland. Flowers from December to January.

POACEAE

Aristida transvaalensis Henrard
Status: LR-lc
 Distribution: Malolotja, Malandzela, Miomba, Forbes Reef
Three records in a protected area by Broun. Widespread in South Africa.

Ehrharta erecta Lam. var. *erecta*
Status: LR-lc
 Distribution: Malolotja
Toxonomy needs attention.

Eragrostis comptonii De Winter
Status: LR-lc
 Endemism: Endemic
 Distribution: Mbabane area, Malolotja
Occurs in shady places at foot of rocks or forest margins. Very similar to Eragrostis curvula.



Mondia whitei, also known from South Africa and Mozambique, is used for medicinal purposes. (Photo: A. Nicholas)

POLYGALACEAE

Heterosamara galpinii (Hook.f.) Palva
Polygala galpinii Hook.f.
Status: LR-lc
 Distribution: Devils Bridge, Kings Forest (Bulembu)
In South Africa, it has been categorised as Rare or even Endangered in previous RDLs. Occurs in unprotected small localities.

PROTEACEAE

Leucospermum gerrardii Stapf
Status: LR-lc
 Distribution: Malolotja (and surroundings)
Fairly common in Mpumalanga (South Africa). Locally common, but restricted distribution. Subpopulation stable. Can survive fires. Habitat specific, soapstone.

PSILOTACEAE

Psilotum nudum (L.) P.Beauv.
Status: LR-lc
 Distribution: Umbeluzi Gorge, Malolotja, Mlawula
A cosmopolitan species, but seldom common anywhere. Widespread in Africa, Madagascar, Mauritius, Australia, Polynesia, Spain, the Americas and so forth.

RUBIACEAE

Pavetta barbertonensis Bremek.
Status: LR-lc
 Distribution: Siteki, Kings Forest, Lebombo Mnts., Palata, Mlawula
Was on the previous Swaziland RDL as Rare.

SAPOTACEAE

Manilkara concolor (Harv. ex C.H.Wright) Gerstner
Status: LR-lc
 Distribution: Bulunga Poort, Mlawula, Siteki, Umbeluzi, Timbutini, Manzini
Recorded in Swaziland by Compton, Culverwell and Kemp.

Manilkara discolor (Sond.) J.H.Hemsl.
Status: LR-lc
 Distribution: Mlawula, Carmichael's, Mzimfopo River
Only in South Africa according to PRECIS, but observed by several people in the wild in Swaziland.

ACANTHACEAE

Barleria axyphylla Lindau

Status: DD

Endemism: Near-endemic?

Threats: Agriculture

Distribution: Tshaneni (Lowveld)

Known only from type collection (1970s) in Komotipoort (South Africa). However, unconfirmed reports that it occurs in Swaziland, as well as Mozambique. Restricted distribution range.

Peristrophe transvaalensis (C.B.Clarke) K.Balkwill

Status: DD

Distribution: Ingwavuma Poort, Hlane Game Reserve

Salpinctum hirsutum T.J.Edwards

Status: DD

Threats: Agriculture, urban expansion

Distribution: Siteki, Hlatikulu, Malandze Road to Maphalaleni

Very little is known about this recently described species.

ALOACEAE

Aloe chortalirioides A.Berger var. *waalliana* (Pale-Evans) Glen & D.S.Hardy

Status: DD

Distribution: Malalotja, Forbes Reef, Mbabane, the Umbeluzi (near Waterford), Hawane Waterfall

The yellow form is found across the border in South Africa. The yellow form is more widely distributed than the red form. Generally known from Limpopo Province and Mpumalanga in South Africa.

Aloe caaperi Baker subsp. *caaperi*

Status: DD

Distribution: Malalotja Valley, Ezulwini, Stegi, 20 km North of Piggs Peak

Found in Malalotja Valley in the mid-veld. Taxonomic problem makes this species difficult to assess. Very common and widespread in South Africa.

Aloe daminella Reynolds

Status: DD

Distribution: Ingwavuma (Southern part)

Was listed as Indeterminate for Swaziland in a previous RDL. No further information available but thought prudent to include it here.

Aloe greatheadii Schanland var. *davyana* (Schanland) Glen & D.S.Hardy

Aloe graciliflora Groenew.; *Aloe barbertoniae* Pole Evans

Status: DD

Some of the above taxa were previously considered to be threatened in the former Transvaal (South Africa). Extremely common and widespread in South Africa.

Aloe integra Reynolds

Status: DD

Threats: Afforestation

Distribution: Malalotja, Usuthu Forests, 3 km east of Mankanyane

Was previously thought to be Rore in Swaziland. Usuthu Forest subpopulation is healthy with well over 500 individuals. Is a forestry conservation site. Identified as areo worthy of protection.

AMARYLLIDACEAE

Clivia caulescens R.A.Dyer

Status: DD

Threats: Collection

Distribution: Devils Bridge

Two records for it in Swaziland. Collected for horticultural purposes.

Clivia miniata (Lindl.) Regel var. *citrina* Watson

Clivia miniata (Lindl.) Regel var. *flava* E.Phillips

Status: DD

Endemism: Near-endemic?

Clivia nabilis Lindl.

Status: DD

No herbarium specimen for Swaziland, but has been observed there.

ANACARDIACEAE

Lannea schweinfurthii (Engl.) Engl. var.

stuhlmannii (Engl.) Kokwara

Status: DD

Likely to be extinct in Swaziland.

Rhus rogersii Schanland

Status: DD

Known from Lydenburg to between Nelspruit and Borberton (South Africa).

ANNONACEAE

Xylopia parviflora (A.Rich.) Benth.

Status: DD

Threats: Collection

Collected for medicinal properties.

ANTHERICACEAE

Chlorophytum acutum (C.H.Wright) Nardal

Status: DD

Single record by Compton. PRECIS does not have it recorded for Swaziland.

Chlorophytum saundersiae (Baker) Nardal

Status: DD

Distribution: Lebombo Mountains

In Swaziland, known mainly from records by Compton.

Common in Eastern Cape and KwaZulu-Natal (South Africa).

ARALIACEAE

Cussonia zuluensis Strey

Status: DD

Distribution: Bulunga Poort, Sipophaneni, Sidvokodvo

One record in Swaziland by Compton.

ASCLEPIADACEAE

Asclepias crassinervis N.E.Br.

Status: DD

Distribution: Mbabane, Usuthu Forest, Komati Pass, Maphalaleni

Reported to occur in Swaziland.

Asclepias cultriformis Harv. ex Schltr.

Status: DD

Distribution: Usuthu, 14 km from Piggs Peak to

Mbabane, unspecified locality in Mbabane

Widespread, although represented by only a few collections.

Brachystelma chlarazanum E.A.Bruce

Status: DD

Distribution: Ingwavuma

Was previously considered to be Rore in South Africa's former Transvaal, but new subpopulations have been found along the escarpment in Swaziland.

Brachystelma circinatum E.Mey.

Status: DD

Known from Codd 9515.

Brachystelma gemmeum R.A.Dyer

Status: DD

Taxonomy of the Swaziland specimens may possibly need attention. The species was previously reported to only occur in South Africa. Known only from a single record in Swaziland.

Brachystelma gerrardii Harv.

Status: DD

Distribution: Black Umbeluzi Valley, Nkomati Pass, Little Usuthu River, Sipocosini, Komati Pass

Recorded in Swaziland by Compton.

Ceropegia ampliata E.Mey.

Status: DD

Distribution: Ngwenya Causeway

Known from collections in Swaziland by Boyliss.

Ceropegia carnasa E.Mey.

Status: DD

Distribution: Komati Pass, Bunya

Known from collections in Swaziland by Kemp.

Ceropegia crassifolia Schltr.

Status: DD

Distribution: Dinedor

Known from collections in Swaziland by Culverwell and Wollis.

Ceropegia decidua E.A.Bruce subsp. *decidua*

Status: DD

Distribution: Sicusha, Mtindekwa River

One record for Swaziland by Compton.

Ceropegia fortuita R.A.Dyer

Status: DD

Distribution: Ngwenya Causeway

In 1976 one site according to Compton. Only occurs in South Africa according to PRECIS.

Ceropegia linearis E.Mey. subsp. *woadii* (Schltr.)

H.Huber

Status: DD

Distribution: Malagwane Hill, Siphofaneni, Mdimba

Recorded in Swaziland by Codd, Olomini, Culverwell and Kemp.

Ceropegia nilotica Kotschy

Ceropegia plicata E.A.Bruce

Status: DD

Distribution: Ingwavuma Poort

Known mainly from old collections (Compton).

Ceropegia pachystelma Schltr.

Status: DD

Distribution: Sicusha

Known mainly from old collections (Boyliss).

Ceropegia racemosa N.E.Br. subsp. *setifera*

(Schltr.) H.Huber

Status: DD

Distribution: Mlawula, Maguga, Gollel, Komati Pass

One site protected, whereas the other is inundated. It is known from several collections such as those of Culverwell, Germishuizen, Olomini and Hilliard.

Ceropegia rendallii N.E.Br.

Status: DD

Known from collections in Swaziland by Boyliss.

Ceropegia sandersonii Decne. ex Haok.f.

Status: DD

Distribution: Sicusha, Ngwenya Causeway, Dinedor,

Mtindekwa River, Maloma

The species is well-collected by Compton.

Waadia singularis N.E.Br.
Status: DD
Endemism: Near-endemic
Reported as a Swaziland endemic, although there is an old record from a neighbouring locality in South Africa.

ASPHODELACEAE

Haworthia limifolia Marlath var. *limifolia*
Status: DD
Threats: Collection
Distribution: Lebombo (Siteki to Pongola)
Collected for medicinal purposes. Also in Mpumalongo and KwaZulu-Natal (South Africa).

Trachyandra asperata Kunth subsp. *swaziensis* Oberm.
Status: DD
Distribution: Ukuthula, Black Umbeluzi Falls, Mbabane
Recorded in Swaziland by Compton.

ASTERACEAE

Helichrysum argyrolepis MacOwan
Status: DD
Distribution: Malolotja, Ukuthula, Usuthu, Mbabane, Ngwenya Mountains, Devils Bridge
Recorded in Swaziland by Compton and Braun. Common in Mpumalongo and KwaZulu-Natal (South Africa).

Helichrysum atrixifolium (Kuntze)
Status: DD
Distribution: Malkerns, Mlawula, Hlatikulu, Hlane Game Reserve, Malandzela, possibly Maguga

Helichrysum aurealum Hilliard
Status: DD
Distribution: Forbes Reef, Hlabanyati Valley, Mbabane
One record in Swaziland by Dlamini. Several records for it in Mpumalanga and KwaZulu-Natal (South Africa).

Helichrysum aureum (Houtt.) Merr. var. *candidum* Hilliard
Status: DD
Distribution: Forbes Reef, Mbabane, Gobola
Known from several varieties in Swaziland. *Helichrysum aureum* var. *aureum* was collected by Compton in the Lebombo. *H. aureum* var. *monocephalum* was collected by Braun in Malolotja. Swaziland seems to be an ecotone for varieties of this species.

Helichrysum chrysargyrum Moeser
Status: DD
Distribution: Black Mbeluzi Valley, Ukuthula, Mbabane, Ngoyoyo
Recorded in Swaziland by Compton. Several records for it in Mpumalanga and KwaZulu-Natal (South Africa).

Helichrysum dasyanthum (Willd.) Sweet
Status: DD
Only one herbarium record for it in Swaziland by Stewart. Generally known from the Cape in South Africa.

Helichrysum difficile Hilliard
Status: DD
Distribution: Forbes Reef
Known from collections in Swaziland by Compton. Common in Gauteng and Mpumalanga (South Africa).

Helichrysum galpinii N.E.Br.
Status: DD
Distribution: Waverly Mine, Ngwenya Mountains, Motjane, Mbabane, Bomvu Ridge
Recorded in Swaziland by Compton. Fairly common in Mpumalanga (South Africa).

Helichrysum mimetes S.Moore
Status: DD
Distribution: Ukuthula, Mbabane, Black Mbeluzi Falls, Havelock

Recorded in Swaziland by Compton. Known from several records in Mpumalanga (South Africa).

Helichrysum mixtum (Kuntze) Maeser var. *grandiceps* Hilliard
Status: DD
Distribution: Ngundwane River, Malandela, Bremmersdorp, Komati Bridge, Kobolando Mountain.
Recorded in Swaziland by Compton.

Helichrysum mutabile Hilliard
Status: DD
Distribution: Evelyn Baring Bridge, Komati Pass
Both records in Swaziland by Compton.

Helichrysum petraeum Hilliard
Status: DD
Distribution: Millers Falls, Palwane Hills
One record in Swaziland by Compton. Known from several records in KwaZulu-Natal (South Africa).

Helichrysum reflexum N.E.Br.
Status: DD
Distribution: Havelock Road, Bomvu Ridge
Record in Swaziland by Compton. Known from several records in Mpumalanga (South Africa).

Helichrysum tongense Hilliard
Status: DD
Distribution: Mpepo
Reported to be rare in South Africa. No information available for Swaziland.

Helichrysum transmantanum Hilliard
Status: DD
Distribution: Malolotja, Mhlambanyatsi Valley, Black Mbeluzi Valley, Emlembe
Recorded in Swaziland by Compton and Broun.

Helichrysum truncatum Burtt Davy
Status: DD
Distribution: Palwane Hills
Known from collections in Swaziland by Compton. Known from several records in Mpumalanga (South Africa).

Helichrysum wilmsii Moeser
Status: DD
Distribution: Black Mbeluzi Falls, Pigg's Peak, Devils Bridge, Emlembe
Recorded in Swaziland by Compton.

Inula paniculata (Klatt) Burtt Davy
Status: DD

Plecotachys palifolia (Thunb.) Hilliard & B.L.Burtt
Status: DD
Distribution: Havelock
Known from collections in Swaziland by Miller.

Senecio mbuluzensis Compton
Status: DD
Distribution: 5 km West of Mhlasheni, Ukuthula, Mbabane, Black Umbeluzi Valley
Widespread. Possibly a near-endemic but information unavailable. Reported to be rare in South Africa. No information available for Swaziland.

Senecio medley-waadii Hutch.
Status: DD
Distribution: Lebombo Mountains (Jozini) to Umtamvuna River, Mlawula
Has succulent stems. Good horticultural potential. Reported to be fairly uncommon in South Africa. No information available for Swaziland.

Senecio umbellatus L.
Status: DD
Widespread in Swaziland. Generally known from the Cape flora in South Africa.

CELASTRACEAE

Allocassia laurifolia (Harv.) N.Robson
Status: DD
Distribution: Jilobi Forest, Mbeluzi Gorge - Shewula
Known from collections in Swaziland by Kemp.

COLCHICACEAE

Sandersonia aurantiaca Haok.
Status: DD
Threats: Collection
Distribution: Hlatikhulu
Rare everywhere and often removed and picked by flower collectors. Also known from elsewhere as the Cape in South Africa.

COMMELINACEAE

Aneilema schlechteri K.Schum.
Status: DD
Endemism: Near-endemic
Distribution: Malinda, Grand Valley
Known from collections in Swaziland by Codd, from two localities.

CRASSULACEAE

Crassula alba Forssk. var. *pallida* Taelken
Status: DD
Endemism: Endemic?
Distribution: Bomvu Ridge, Mukusini Hills, Nyokane
Recorded from Swaziland by Compton and Dlamini.

Crassula alba Forssk. var. *parvisepala* (Schanland) Taelken
Status: DD
Distribution: Malolotja, Maguga, Ngenya Hills, Siteki, Bearded man Mountain.
Known mainly from three records, one in a protected area. Two are possibly in an inundated area.

Crassula compacta Schanland
Status: DD
Distribution: Bomvu Ridge
Known from collections by Compton and Farsyth-Thompson.

Kalanchoe alticola Compton
Status: DD
Distribution: Mukusini Hills

Kalanchoe luciae Raym.-Hamet subsp. *mantana* (Compton) Toelken
Status: DD
Endemism: Near-endemic
Distribution: Devils Bridge, Mbabane, Hilltop
Recorded in Swaziland by Compton and Dlamini.

Kalanchoe sexangularis N.E.Br.
Kalanchoe ragersii Raym.-Hamet
Status: DD
Threats: Grazing
Distribution: Ingwavuma Poort (Lebamba)
Habitat specialist, but with a scattered distribution. Cattle grazing is a threat.

CYPERACEAE

Castularia natalensis C.B.Clarke
Tetraria natalensis (C.B.Clarke) Koyama
Status: DD
Threats: Afforestation
Distribution: Usuthu Forest, Dalriah, Ukuthula, Pigg's Peak
Found in grassland and forest margins. In KwaZulu-Natal (South Africa), it is threatened by afforestation. The commonly used genus name is *Tetraria*. Common in

KwaZulu-Natal, Mpumalanga and Limpopo Province (South Africa).

Schoenoxiphium lehmannii (Nees) Steud.

Kabresia lehmannii (Nees) Koyama var. *lehmannii*

Status: DD

Threats: Urban expansion, collection

Distribution: Malolotja, Hilltop

The synonym was listed as threatened in previous RDLs. Hilltop site near an informal settlement where it is highly threatened. Used for basketry. Very common in South Africa.

DRYOPTERIDACEAE

Polystichum macleae (Baker) Diels

Status: DD

Fairly common in South Africa's Mpumalanga and Limpopo Province.

Polystichum transkeiense Jacobsen

Status: DD

Distribution: Kings Forest

Known from collections in Swaziland by Burrows.

EBENACEAE

Euclea undulata Thunb.

Status: DD

Distribution: Simunye, Sicusha, Golela

Only one record for Swaziland by Rodin.

ERICACEAE

Erica revoluta (Bolus) L.E.Davidson

Erica austraverna Hilliard

Status: DD

No known herbarium specimens for Swaziland, but observed there in the wild.

EUPHORBIACEAE

Croton steenkampianus Gerstner

Status: DD

Distribution: Blue Jay Ranch (Mlawula)

One record in a protected area by Lycette. Known to be extremely common outside Swaziland.

Euphorbia knobellii Letty

Status: DD

Swaziland specimens should be checked and taxonomy needs attention.

Synadenium cupulare (Boiss.) L.C.Wheeler

Status: DD

Distribution: Mdhethshana farm

Recorded in Swaziland by Miller.

GENTIANACEAE

Sebaea erosa Schinz

Status: DD

Distribution: Mbabane

Known from collections in Swaziland by Compton.

GESNERIACEAE

Streptocarpus cyaneus S.Moore

Status: DD

Distribution: Millers Falls, Mmhlambanyati, Piggs Peak, Malkerns, Malolotja

Streptocarpus penterianus Fritsch

Status: DD

Threats: Urban expansion

Distribution: Mbabane, Hawane Falls

Restricted distribution. Does not appear in PRECIS.

Streptocarpus polyanthus Hook. subsp. comptonii (Mansf.) Hilliard

Status: DD

HIPPOCRATEACEAE

Salacia gerrardii Harv.

Status: DD

Distribution: Jilobi, Muti-muti

Only in South Africa according to PRECIS.

HYACINTHACEAE

Drimiopsis maxima Baker

Status: DD

Distribution: Usuthu Mission

Ornithogalum capillare J.M.Wood & M.S.Evans

Status: DD

Known from many localities in South Africa. The distribution tips into Swaziland.

Ornithogalum monophyllum Baker

Status: DD

Distribution: Nduma, Mbabane (Fonteyn), Havelock

Recorded in Swaziland by Compton, Dlomini and Kemp.

Ornithogalum saundersiae Baker

Status: DD

Distribution: Marula Ridge, Mbabane, Cecil Mancks Pass

Recorded in Swaziland by Compton and Nicholson.

HYPOXIDACEAE

Hypoxis hemerocallidea Fisch. & C.A.Mey.

Status: DD

Very widely used. Still very widespread and abundant in the wild.

IRIDACEAE

Dierama adelphicum Hilliard

Status: DD

Distribution: Unspecified locality in Swaziland

Known from Limpopo Province and Mpumalanga (South Africa).

Dierama insigne N.E.Br.

Status: DD

Distribution: Oshoek

Common in South Africa.

Dierama medium N.E.Br.

Status: DD

Distribution: Usuthu, Waverley Mine

Common in South Africa.

Dierama mossii (N.E.Br.) Hilliard

Status: DD

Distribution: Forbes Reef

Known from several collections from Forbes Reef.

Common in South Africa.

Gladiolus ferrugineus Goldblatt & J.C.Manning

Gladiolus varius F.Bolus var. *micranthus* (Baker) Oberm.

Status: DD

Distribution: Forbes Reef, 4.5 km West of Piggs Peak

Common in South Africa.

Gladiolus hollandii L.Bolus

Status: DD

Previously listed as Rare for South Africa's former Transvaal and Swaziland. It is reported to be common in hills above Borberton in South Africa, as it is a highveld species. Common in South Africa.

Hesperantha umbricola Goldblatt

Status: DD

Endemism: Endemic?

Threats: Habitat degradation

Distribution: Mbabane hills

Apparently there are closely related specimens from southern KwaZulu-Natal (South Africa).

LAMIACEAE

Hemizygia petiolata M.Ashby

Status: DD

Distribution: Maguga, Sisa

Hemizygia pretoriae (Gürke) M.Ashby subsp. heterotricha Codd

Status: DD

Distribution: Hlatikhulu, Verdun, Kubuta, Gege

Recorded in Swaziland by Compton.

Hemizygia pretoriae (Gürke) M.Ashby subsp. pretoriae

Status: DD

Distribution: Ngotshane

Known from collections by Compton.

Hemizygia transvaalensis (Schltr.) M.Ashby

Status: DD

Distribution: Malolotja, Piggs Peak

One record for Swaziland requiring confirmation.

Plectranthus rubropunctatus Codd

Status: DD

Distribution: Mdzimba, Forbes Reef, Ermelo Rd., Piggs Peak, Mbabane

Plectranthus zuluensis T.Cooke

Status: DD

Endemism: Near-endemic

Distribution: Mdzimba, Umbeluzi

Recorded in Swaziland by Culverwell.

Stachys aethiopica L.

Status: DD

Distribution: Isiteki Beacon

Known mainly from old collections (Compton).

Stachys arachnoidea Codd

Status: DD

Distribution: Mbabane District, Malolotja, Piggs Peak, Forbes Reef

Stachys natalensis Hochst. var. galpinii (Briq.) Codd

Status: DD

Distribution: Malolotja, Havelock mine, Nduma, Ngwenya Mountain.

Stachys simplex Schltr.

Status: DD

Distribution: Malolotja, Mbabane

Stachys tubulosa MacOwan

Status: DD

Only in South Africa according to PRECIS. However, certain that it occurs in Swaziland, but never surveyed.

Thorncroftia thorncroftii (S.Moore) Codd

Status: DD

Endemism: Near-endemic

Distribution: Northwest of Piggs Peak (mountains) Found at a neighbouring locality in South Africa.

LAURACEAE

Ocotea kenyensis (Chiov.) Robyns & R.Wilczek

Status: DD

Distribution: Kings Forest (Bulembu), Malolotja

LEGUMINOSAE: CAESALPINIOIDEAE

Chamaecrista capensis (Thunb.) E.Mey. var. *capensis*
Status: DD
 Distribution: Hawane Falls
 Known from collections by Compton and Stewart.

Chamaecrista capensis (Thunb.) E.Mey. var. *flavescens* (Thunb.) E.Mey.
Status: DD
 Distribution: Stroma
 Known from collections in Swaziland by Compton.

LEGUMINOSAE: PAPILONIOIDEAE

Tephrosia albissima H.M.L.Forbes subsp. *albissima*
Status: DD
 Distribution: Mankayane
 Known from collections in Swaziland by Compton.

Tephrosia brummittii Schrire
Status: DD
 Endemism: Endemic? -
 Distribution: Black Umbeluzi Falls, Malandzela
 Recorded in Swaziland by Compton and Germishuizen.

Tephrosia capensis (Jacq.) Pers. var. *capensis*
Status: DD
 Known mainly from old collections (Magg).

Tephrosia natalensis H.M.L.Forbes subsp. *natalensis*
Status: DD
 Distribution: Evelyn Baring Bridge, Tshaneni, Mankaiana
 Recorded in Swaziland by Compton.

Tephrosia retusa Burtt Davy
Status: DD
 Only in South Africa according to PRECIS. However, certain that it occurs in Swaziland, but never surveyed.

LOBELIACEAE

Monopsis malvacea E.Wimm.
Lobelia coddii Compton
Status: DD
 Endemism: Endemic
 Distribution: Mbabane, Hlatikulu

LORANTHACEAE

Tapinanthus forbesii (Sprague) Wiens
Status: DD
 Distribution: Tshaneni

Tapinanthus gracilis Toelken & Wiens
Status: DD
 Distribution: Ingwavuma Poort
 Known from collections in Swaziland by Compton and Dlomini.

Tapinanthus rubromarginatus (Engl.) Danser
Moeser
Status: DD
 Distribution: Hlatikhulu, Mankaiana, Tshaneni
 Three records by Compton, Dlomini and Korsten.

LYTHRACEAE

Nesaea sagittifolia (Sond.) Koehne var. *ericiformis* Koehne forma *swaziensis* Immelman
Status: DD
 Basically known from four records by Compton and Korsten.

Nesaea zambatidis Immelman
Status: DD
 Distribution: Mlawula
 Known from collections in Swaziland by Culverwell.

MARSILEACEAE

Marsilea fenestrata Launert
Status: DD
 Locally common in seasonally inundated pans.

MELIACEAE

Turraea floribunda Hochst.
Status: DD
 Distribution: Lebombo Mountains, Mhlophe, Siteki
 Recorded in Swaziland by Compton.

MELIANTHACEAE

Bersama transvaalensis Turrill
Status: DD
 Known from two records in Swaziland by Dlomini. From a South African perspective, unlikely to be rare.

MORACEAE

Ficus burtt-davyi Hutch.
Status: DD
 Distribution: Shiselweni Forest Company
 Known from two subpopulations in Swaziland.

OCHNACEAE

Ochna arborea Burch. ex DC. var. *oconnorii* (E.Phillips) Du Toit
Status: DD
 Distribution: Muti Muti, Jilobi, north of Mbabane
 Unconfirmed report that it occurs in Swaziland.

Ochna gamostigmata Du Toit
Status: DD
 Distribution: Havelock Concession

OLEACEAE

Olea woodiana Knobl.
Status: DD
 Distribution: Jilobi, Ubombo Mountain.
 Recorded in Swaziland by Miller.

OLINIACEAE

Olinia emarginata Burtt Davy
Status: DD
 Distribution: Jilobi
 Previously reported only to occur in South Africa.

ORCHIDACEAE

Calanthe sylvatica (Thouars) Lindl.
Calanthe notolensis (Rchb.f.) Rchb.f.
Status: DD
 Distribution: Malandela
 In evergreen and riverine montane forest, near streams and swampy areas. Also known from the Eastern Cape in South Africa. Widespread throughout Tropical Africa and Madagascar.

Eulophia speciosa (R.Br. ex Lindl.) Bolus
Eulophia oustooocidentalis Sölth.; *Eulophia leucontho* (Kraenzl.) Sölth.
Status: DD
 Distribution: Mlawula, Umbeluzi Gorge
 Northwards into Tropical Africa. Also reported from the

Cope oreo (South Africa). Both synonyms were classified as threatened in previous RDLs.

Habenaria bicolor Conrath & Kraenzl.
Habenaria loevigata Lindl. subsp. *bicolor* (Conrath & Kraenzl.) Schltr.
Status: DD
 Known mainly from Gauteng (South Africa). Flowers mainly from March to April. According to PRECIS, two localities outside Swaziland. Apparently new specimens collected from Swaziland. Reported from Zimbabwe but very unlikely. Known from grasslands.

Habenaria culveri Schltr.
Status: DD

Neobolusia tysonii (Bolus) Schltr.
Status: DD
 Distribution: Forbes Reef
 Widespread in South Africa from the Eastern Cape to Mpumalongo. Small cross-border distribution in Swaziland.

PASSIFLORACEAE

Adenia hastata (Harv.) Schinz var. *glandulifera* W.J.de Wilde
Status: DD
 Distribution: Bulunga Poort
 Single record by Compton.

PERIPLOCACEAE

Mondia whitei (Hook.f.) Skeels
Status: DD
 Threats: Collection
 Distribution: Siteki, Ubombo
 Widespread, and probably utilised everywhere. Known from several collections in Swaziland. Harvested for medicinal purposes. Nothing is known about the rates of utilisation in Swaziland, and distributions from herbarium collections in Swaziland could not be confirmed.

POACEAE

Ehrharta erecta Lam. var. *natalensis* Stapf
Status: DD
 Distribution: Malolotja
 Known from collections in Swaziland by Broun. Widespread in the summer rainfall region of South Africa.

Eragrostis barbinadis Hack.
Status: DD
 Endemism: Near-endemic
 Distribution: Nkomati River Valley
 Also known from South Africa.

Sartidia jucunda (Schweick.) De Winter
Status: DD
 Endemism: Near-endemic
 Distribution: Malolotja
 The species is restricted to the Borberton Mountains. Known from only a single site outside Swaziland.

Sartidia sp.
Status: DD
 Endemism: Near-endemic
 Distribution: Malolotja (N & S)
 Found on serpentine soils, but undescribed for more than a decade.

Thamnochlamus tessellatus (Nees) Sonderstr. & R.P.Ellis
Arundinaria tessellata (Nees) Munro
Status: DD
 Dispute as to how abundant this species is in Swaziland. Well represented outside Swaziland. Utilised throughout its range.

PROTEACEAE

Faurea macnaughtonii E.Phillips

Status: DD

Distribution: Mlumati, Malolotja, Shelangubu Valley
Locally common, but restricted distribution in Swaziland.

RHIZOPHORACEAE

Cassipourea swaziensis Compton

Status: DD

Endemism: Near-endemic

Threats: Grazing, fire

Distribution: Mhlosheni, 2 km north of Mbabane, Nhlanguano, Nsongweni

Very restricted in Swaziland. Also in South Africa (KwaZulu-Natal, Mpumalanga?). Quartzite. Area poorly collected, only old collections. Cattle grazing and population growth a problem.

RUBIACEAE

Canthium suberosum Codd

Status: DD

Distribution: Hlatikhulu

Known from specimens collected by Compton.

Pavetta zeyheri Sond.

Pavetta micralancea-K.Schum.

Status: DD

The synonym was listed as threatened in previous RDLs. Known only from old collections.

Pentas micrantha Baker subsp. *wyliei* (N.E.Br.) Verdc.

Status: DD

Distribution: Mapokane, Mnyame, Komati Valley, Tulwane

RUTACEAE

Teclea gerrardii I.Verd.

Status: DD

Distribution: Muti Muti, Jilobi

Recorded in Swaziland by Miller.

Teclea natalensis (Sond.) Engl.

Status: DD

Teclea pilosa (Engl.) I.Verd.

Status: DD

SAMYDACEAE

Homalium dentatum (Harv.) Warb.

Status: DD

Distribution: Jilobi, Siteki, Tibulati stream

Recorded in Swaziland by Miller.

SANTALACEAE

Thesium gracilentum N.E.Br.

Status: DD

Distribution: Emlebo Mountain (Havelock Concession)

Found in an inaccessible habitat.

STERCULIACEAE

Crassula greenwayi Brenan

Status: DD

Distribution: Shewula (Umbeluzi Gorge North Bank), Muti Muti

Sterculia murex Hemsl.

Status: DD

Only in South Africa according to PRECIS. However, certain that it occurs in Swaziland but never surveyed.

TURNERACEAE

Triliceras laceratum (Oberm.) Oberm.

Status: DD

Distribution: Tshaneni

Known from collections in Swaziland by Edwards and Culverwell.

Triliceras longipedunculatum (Mast.) R.Fern. var. *longipedunculatum*

Status: DD

Known mainly from old collections (Borrett).

VERBENACEAE

Vitex rehmannii Gürke

Status: DD

Distribution: Siteki

Known from collections in Swaziland by Miller.



Encephalartos relictus is classified as *Extinct in the Wild*. (Photo: P.J.H. Hurter)

Zambia



Mike G. Bingham* & Paul P. Smith†

Introduction

The Zambian flora is characterised by extensive areas of relatively undisturbed habitat, well-defined areas of local endemism, very restricted montane areas, and a high proportion of wetlands (Fanshawe 1963–1973, 1971, White 1968).

The most extensive vegetation type in Zambia is miombo woodland, dominated by the caesalpinoid genera *Brachystegia*, *Julbernardia*, and *Isoberlinia*. Miombo woodland is also widespread in the Democratic Republic of Congo (DRC), Malawi, and Tanzania. Large areas of miombo woodland in Zambia remain relatively undisturbed.

This is the first comprehensive Red Data List (RDL) treatment of the Zambian flora and is based mainly on the endemic plants of Zambia. Zambia shares most of its areas of endemism with neighbouring countries, and it is likely that when these border areas become better known, many of the species

listed as endemics in this chapter will be found to be near-endemics.

The main centres of endemism in Zambia are:

- The Zambezi source area in Mwinilunga District, shared with Angola and the DRC
- The Bangweulu Basin, shared with the DRC
- The Mweru–Tanganyika Basin, including the Itigi Thicket area, shared with Katanga (in the DRC) and Tanzania
- The mid-Zambezi Valley, shared with Zimbabwe
- The montane areas, shared with Malawi and Tanzania

The first four of these centres belong to the Zambezian Regional Centre of Endemism (White 1983); the last belongs to the East African Montane system, which consists of a broken chain of mountains, associated with the East African Rift, extending from the Arabian Peninsula to the Drakensberg of South Africa.



Mwinilunga grassland–forest interface. (Photo: J. Burrows)

*Woodlands, Lusaka, Zambia

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Capital: Lusaka, largest city

Area: 752,614 km²

Languages: English (official), Bemba, Lozi, Nyanja, Tonga

Currency: Zambian kwacha (ZK)

Total plant species: 4,747

Total plant endemics: 201

Total RDL plants: 505

Focal RDL institution: PRE, K

Number of Protected Areas: 19 National Parks, 35 Game Management Areas and other formal and informal protected areas.

Population: 9,881,210 **Growth Rate:** 2.2% **Density:** 12.7 people/km²

Phytogeography: Zambezian, with a small area of Afromontane in the northeast.

Flora: Miombo woodland, with drier mopane woodland in the Luangwa and Zambezi Valleys and parts of the west on Kalahari sands. Patches of lowland forest in the northwest, and montane forest and grassland in the northeast.

Sources: Anonymous 2000, Fanshawe 1969, Stuart & Adams 1990

Table 1. Correspondence between *Flora zambesiaca* geographical divisions (Pope & Pope 1998) and current provincial divisions.

Flora zambesiaca geographical divisions	Current provincial divisions
Barotseland (B)	Western Province and part of North-Western Province
Northern Region (N)	Northern Province and Luapula Province
Western Region (W)	Copperbelt Province and North-Western Province (except western part, which is in <i>Flora zambesiaca</i> Barotseland)
Central Region (C)	Lusaka Province and part of Central Province (except the western part, Mumbwa, which is in <i>Flora zambesiaca</i> Southern Region)
Eastern Region (E)	Eastern Province
Southern Region (S)	Southern Province and part of Central Province (western part)

Methods

The first stage in the RDL compilation process was a SABONET workshop held in Lusaka, Zambia (15–21 June 2000). The workshop participants were initially trained to apply the methodology of the IUCN (1994) system of assessing conservation status. Thereafter, a draft national RDL was produced and was circulated for revision by specialists with taxonomic expertise and botanical knowledge of the Zambian flora.

Sources of Data

The two primary data sources for the compilation of Zambia's RDL were a checklist sourced from the IUCN Threatened Plants Committee (TPC) (1981), and *Flora zambesiaca* (1960–present).

The IUCN TPC checklist is unpublished and was obtained from the Herbarium of the Division of Forest Research (NDO) in Kitwe, where it was still being used as a working document. The checklist is biased towards the better-known, high profile species.

Table 2. Results of the RDL assessments for Zambia.

Category	Number of taxa
Critically Endangered (CR)	3
Endangered (EN)	7
Vulnerable (VU)	136
Lower-Risk near threatened (LR-nt)	30
Lower-Risk least concern (LR-lc)	84
Data Deficient (DD)	245
Total on RDL	505
Endemics, suspected endemics, and near endemics with RDL assessment	329
Threatened endemics, suspected endemics, and near endemics (CR, EN, VU)	85

Flora zambesiaca, our second source, is approximately 60% complete. The compilers of the RDL nevertheless had access to unpublished *Flora zambesiaca* manuscripts for the Poaceae, Fabaceae, and Rubiaceae, which increased the taxonomic coverage to around 70% of Zambia's flora.

Additional sources of information were Frank White's *Forest Flora of Northern Rhodesia* (1962) and taxonomic revisions published in various journals. For several families for which published data were unavailable or deficient, assistance was sought from specialist taxonomists at K (Royal Botanic Gardens, Kew, England) and PRE (National Herbarium, Pretoria, South Africa). Otherwise, there was no direct input from any herbaria and the significant collections amassed over the past decade by the local herbaria, even when they had been reliably identified, hardly featured.

Global Red Lists compiled by the IUCN (Walter & Gillett 1998) and WCMC (Oldfield *et al.* 1998) were also consulted and Zambian species that appear on these lists were subsequently re-evaluated. The gazetteer by Pope & Pope (1998), which makes use of *Flora zambesiaca* geographical divisions, assisted in the process of estimating measures of distribution range (*Extent of Occurrence* and *Area of Occupancy*).

Working Assumptions

Assessments were conducted by making various assumptions and inferences. Factors such as the conspicuous nature of the plant, proximity to human settlements, and proximity to main access routes, were used in the assessment process on a species-by-species basis. For example, the assumption was made that the more conspicuous the plant, the more likely that it would have been collected by botanists and hence reflected in the number of herbarium collections; likewise, the habitats of plants are more likely to be degraded if they occur

close to human settlements or along main access routes. Occurrence of species in habitats known to be threatened was also a consideration.

A second set of factors that was taken into account was the probable distribution range of the species. For example, it was assumed that plants are probably widely distributed if the herbarium records reflect disjunct populations within the same plant habitat.

The VU D2 Category (*Vulnerable*) was assigned in cases where a plant was known only from its type locality or known to be of limited distribution. Species known only from the type collection were assigned *Data Deficient* status where locality or collection data were ambiguous.

Results and Discussion

The Red Data List

A total of 505 species are listed on the RDL for Zambia, out of a total flora of about 5,000 species (Table 2). Of these, 146 were assessed as threatened (*Critically Endangered* (CR), *Endangered* (EN) and *Vulnerable* (VU)), but as almost half of the total number of species assessed (245) were rated as *Data Deficient* (DD), many changes in future status may be anticipated. The majority of species designated as DD have too few or ambiguous collection details, whereas many others have uncertain taxonomy (see Golding & Smith 2001). The vast majority of Zambian species on the global RDLs compiled by IUCN (Walter & Gillett 1998) and WCMC (Oldfield *et al.* 1998) were evaluated and subsequently excluded from this RDL.

While compiling the Zambian RDL, we were constrained by the lack of a national plant checklist and by incomplete data—when national checklists are available and endemics are noted, these form a basis for

Table 3. The ten families with the highest representation on the Zambian RDL.

Family	Number of taxa
Leguminosae	58
Orchidaceae	55
Euphorbiaceae	50
Rubiaceae	46
Cyperaceae	34
Poaceae	33
Asteraceae	20
Scrophulariaceae	20
Gentianaceae	11
Hypoxidaceae	10

systematically compiling an RDL. For example, a high number of endemic sedges (Cyperaceae) may be expected in a country such as Zambia, where wetlands account for 30–40% of the surface area (Fanshawe 1971). Yet, the number of sedges represented on the RDL is not as high as expected. This is probably due to gaps in our current knowledge—to date no comprehensive taxonomic treatments have been published for the Cyperaceae. The same holds for the Acanthaceae, Lamiaceae, and most of the petaloid monocotyledonous families. Even amongst those families that have been published in *Flora zambesiaca*, there are many with species described from single collections or only from the type locality in Zambia. The status of such species will not be fully understood until more fieldwork is done and the collected plant material reviewed.

As more fieldwork is carried out and new species are discovered and described, the number of species in the threatened categories will probably increase. On the other hand, as more information about known species becomes available, many species currently designated VU D2 or DD are likely to shift status or be removed from the list.

Endemics

As with most countries in the Zambezian Regional Centre of Endemism (White 1983), Zambia has relatively few endemics (201 confirmed endemics; 128 suspected or near-endemics) for a country of its size (about 735,000 km²). The list of endemics presented here is much higher than previously published.

The majority of Zambian endemics belong to the largest plant families worldwide (Mabberley 1987; see Table 3), in sharp



***Elaphoglossum zambesianum* from the source of the Zambezi River.**
(Photo: J. Burrows)

contrast to the winter-rainfall areas of South Africa and southwestern Australia, where recent speciation has produced large numbers of endemic or near-endemic taxa at the supra-specific level (genera and families) (Cowling & Hilton-Taylor 1994). This is because recent speciation in the Zambezian Region is possibly not as prevalent as in many other regions, and suggests a stable environment in which competition for essential nutrients amongst established species is sufficiently vigorous to exclude invaders or suppress variation. The opportunities for rapid speciation, particularly of annuals, appear to be limited in tropical Africa.

Threats to Plant Species in Zambia

The major threats to plant species in Zambia are:

- Habitat loss through human settlements, urbanisation, cultivation, overgrazing, exploitative range management and engineering projects
- Non-sustainable utilisation of species
- Alien plant infestations

Perhaps the most sensitive area in Zambia is the Ikelenge “Pedicel” in the northwestern corner of Mwinilunga District. This area, which includes the source of the Zambezi River, is the richest in species and in local endemism (Bingham 1994). It is also relatively densely populated. The growth of the city of Lusaka alone has accounted for the destruction of a significant area of miombo woodland. More serious, however, is the threat to the flora of the carbonate outcrops to the west of Lusaka City, which are the only known habitat of *Euphorbia*

debilisipina and probably also other species.

Deforestation for woodfuel has occurred extensively along railway lines; in addition the plant habitats associated with the more important waterbodies used for fishing (for example, the northern lakes and the Luapula Valley) have become degraded (Bingham 1998). Although felled but uncultivated miombo woodland areas can rapidly regenerate, degradation of more sensitive habitats is irreversible.

Threatened habitats in Zambia include the following:

- Riparian forest—clearing for cultivation, especially in the Ikelenge “Pedicel” (Zambezi Source area) of Mwinilunga District
- Itigi Thicket in Northern and Luapula Provinces—settlement and cultivation
- Mateshi evergreen thicket in Northern and Luapula Provinces—cultivation and fires
- Livunda *Cryptosepalum* forest in northwestern Zambia—over-exploitation and cultivation
- *Baikiaea* forest in Western Province—over-exploitation, cultivation and fires
- The Kafue Flats—changes in the flood-

Table 4. Endemism on the Zambian RDL.

Endemism	Number of taxa
Confirmed endemic	201
Suspected endemic	84
Confirmed near-endemic	17
Suspected near-endemic	27
TOTAL	329



Disa walleri, *Habenaria holubii*, and *Brachychorythis pleistophylla*, all possibly used for *chikanda*.

(Photos: G. Williamson)

ing regime necessitated by hydropower generation

- The Lusaka dolomites—urban expansion and quarrying

Invasive alien plants of Australian origin, such as *Acacia* species and proteaceous trees and shrubs, that are major invaders in the subtropical areas of southern Africa, are not a problem in Zambia, and most are difficult to grow. The most serious invaders in Zambia are from tropical South America and India. They include *Lantana camara*, *Psidium guajava*, *Toona ciliata*, and *Solanum hispidum*. Probably the most successful alien is the herb *Ageratum conyzoides*, although it is unlikely to have displaced any indigenous species. *Solanum mauritianum* ("Bugweed") and *Chromolaena odorata* ("Triffid Weed") both occur in disturbed places, but are effectively controlled by periodic droughts.

Important Utilised Species

Not all utilised species in Zambia have been placed on this RDL. All utilised species should, however, be monitored, as they may in future be good candidates for RDLs if they are not utilised sustainably. The export trade in indigenous hardwood timbers employs large numbers of people in harvesting and marketing, but there is far too little effective control (Campbell 1996).

Daniellia alsteeniana is the only species known to have been exploited commercially that also has a very limited known distribution in the country. This species is known in Zambia only from the northern

half of Luapula and Northern Provinces; recent accounts state that it has been extensively depleted and that many sites have been extirpated, particularly in Mporokoso District.

Zambezi teak (*Baikiaea plurijuga*), which was Zambia's major export before copper and tobacco came into prominence, is rapidly becoming depleted. Many of the most productive teak forest areas are now totally destroyed by repeated harvesting of progressively smaller logs, as well as destructive fires.

The most important indigenous timber for export and domestic use is mukwa (*Pterocarpus angolensis*). It has some measure of protection in vast areas that have no ready access, but areas of intensive extraction are being expanded continually. Since the tree is never dominant in Zambia, the extraction of timber does not seriously affect the environment, although there is likely to be a long-term decline in the timber quality of the tree.

Guibourtia coleosperma, sold mostly to South Africa as rosewood, is currently being exploited in considerable quantities. Fortunately, it is more fire-tolerant than most woodland species and populations are not likely to be seriously affected.

The exploitation of *Dalbergia melanoxylon* (African ebony), the wood used for making clarinets and oboes, is a cause for concern in East African countries. Although fairly common in the drier parts of Zambia, the tree rarely achieves a size large

enough to sustain a viable industry, although it is much used in carvings.

Many other species are exploited for woodcarvings, drums, stools, pestles and mortars, bridges, huts and other temporary structures (Campbell 1996). Trees suitable for dugout canoes are no longer found near the major sources of fish. On the Kafue Flats, the species now most commonly exploited is the palm *Borassus aethiopicum*, which takes at least 25 years to mature.

Several sources of fibre for weaving are exploited for domestic use, as well as for crafts for the tourist trade (Campbell 1996). These include the following:

- The bast fibre of several trees, used for ropes and string
- The palms *Calamus deeratus* (rattan), *Hyphaene petersiana*, and *Raphia farinifera*
- The roots of the tree *Combretum zeyheri* (mukenge)
- *Cyperus papyrus* (papyrus)
- *Oxytenanthera abyssinica* (bamboo)

No comprehensive RDL assessments of the status of these plants have been undertaken, because information on the rates of utilisation and their distribution was unavailable. The three palms all need to be monitored—excessive harvesting of the leaves prevents the plants from reaching maturity. Since palms provide habitats for a number of animal species, the elimination of mature trees from extensive areas restricts the habitat of these animals. The greatly increased demand for the edible tubers of orchids belonging to the gen-

era *Disa*, *Satyrium*, *Habenaria*, *Brachycorythis*, and probably others for making a product called *chikanda* or “African polony” has seen the depletion of these orchids over much of Zambia and Malawi (Bingham & Kokwe 2001, Golding 2001, Ng’uni *et al.* 2001). In fact, much of the product being sold on urban Zambian markets is imported from Angola and Tanzania.

Of similar concern is the unsustainable harvesting of “African potato”, the bulbs of several *Hypoxis* species sold as a cure for many ailments, including HIV/AIDS, throughout the region.

Conclusion

All of Zambia’s local centres of endemism have been relatively well-collected in the past by notable collectors such as Richards, Astle, White, Fanshawe, Robinson, and Milne-Redhead. However, botanists have neglected most of these areas for the past 40 or 50 years. There is therefore an urgent need to reassess these centres and the many endemic species they contain.

In compiling the Zambian RDL, we were constrained by the lack of a good botanical library in the country, and, in particular, by the virtually dormant state of local herbaria. Curation has been minimal since the early 1970s and during the 1980s little or no fumigation was carried out in any of the herbaria, resulting in catastrophic losses.

More work is required before this RDL can be said to truly reflect the conservation status of Zambia’s flora. Input is urgently needed from systematic specialists, particularly to reduce the number of DD species on the list. In addition, more cooperation from specialists within southern Africa—ecologists, foresters, and conservationists—and people with knowledge of other relevant disciplines—ethnobotanists, anthropologists, and so forth—is required.

Outdated species data were also a major limitation in the compilation of this RDL. As better data become available, the RDL presented here should be refined to give a more accurate reflection of Zambia’s threatened flora.

The value of this first comprehensive plant RDL for Zambia is that it will form the basis of subsequent lists, and is something for everyone to work with. We hope that the conservation and scientific communities will rise to this challenge, and freely contribute their knowledge towards updating this list throughout its many future iterations.

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The area of Zambezi Rapids is rich in flora but under-studied. (Photo: J. Burrows)

EXTINCT & THREATENED

AMARANTHACEAE

Celosia richardsiae C.C.Towns.

Status: VU D2

Endemism: Endemic?

Distribution: North

Type is from Mweru Wantipa. Known from a steep area near moisture. Collected at an altitude of 1,000 m.

ANNONACEAE

Uvaria edulis N.Robson

Status: VU D2

Distribution: West

Type from Zambezi River north of Kaleni Hill Mission. Possibly known only from the type.

APIACEAE

Aframmi longiradiatum (H.Wolff) Cannon

Status: VU D2

Endemism: Near-endemic?

Distribution: North

Type from DRC.

Frommia ceratophylloides H.Wolff

Status: VU D2

Distribution: East

High montane endemic. Very characteristic looking plant. Stands 1 m tall.

APOCYNACEAE

Adenium multiflorum Klotzsch

Status: VU D1D2

Occurs northwards to East Africa. Sometimes varietal status is used, but this is not the case in Zambia.

Strophanthus eminii Aschers. & Pax

Status: VU D2

Distribution: North

Endemic to the Itigi thicket. Type is from Tanzania. Has very large conspicuous leaves.

ARALIACEAE

Schefflera abyssinica (Hochst. ex A.Rich.) Harms

Status: VU D2

Distribution: North

Habitat is near waterfall sprays. It is an epiphyte occurring in small localities. Species has the potential to be exploited because it is a popular horticultural plant. Well-represented in East Africa.

ASPHODELACEAE

Aloe excelsa Berger

Status: VU D2

Distribution: South

Only one disjunct locality in Zambia (from a rocky gorge), but widespread in Zimbabwe. Well-represented outside Zambia.

ASTERACEAE

Ageratinastrum palustre Wild & G.V.Pope

Status: VU D2

Endemism: Endemic?

Distribution: North

Swampy or damba areas with tall grasses. Altitude of 1,350 m. Type from Ndunda Swamp, Mbala. Cannot

confirm whether it occurs in Tanzania. Possibly known only from the type.

Erythrocephalum albiflorum Wild

Status: VU D2

Endemism: Endemic?

Distribution: West

In Brachystegia and mixed deciduous woodland. Type is from Salwezi. Known from western Zambia and possibly from Malawi. Very conspicuous. Is an erect suffrutescent.

Gutenbergia mweroensis Wild & G.V.Pope

Status: VU D2

Endemism: Endemic

Distribution: North

In a sandy area on the lake foreshore in swampy and rocky places.

Gutenbergia spermacoceoides Wild

Status: VU D2

Distribution: North

Type is from Mungwi (Kasama District). Sandy soils often in pan-like depressions. Known only from the northern region of Zambia. One specimen from western Tanzania in the same habitat.

Gutenbergia trifolia Wild & G.V.Pope

Status: VU D2

Endemism: Endemic

Distribution: West

Collected in shallow peaty soil near a waterhole. Known only from the type.

Pleiotaxis oxylepis Jeffrey

Status: VU D2

Endemism: Near-endemic

Distribution: North

Miamba woodland often on steep slopes. Type is from Kalamba Falls, collected there twice. Also known from Tanzania. Narrow distribution range.

Vernonia isoetifolia Wild

Status: VU D2

Endemism: Endemic

Distribution: North

Moist sandy grassland. Type from Kambale-Mbala Raad. Known only from around Mbala.

Vernonia mutimushii Wild

Status: VU D2

Endemism: Endemic

Distribution: North

Slightly moist dambas. Type is from Manchele.

Vernonia najas Wild

Status: VU D2

Endemism: Endemic?

Distribution: West

Sandy watershed grassland. Type from Mwinilunga, 18 km east of Kaleni Hill. Possibly known only from Zambia.

Vernonia zambiana G.V.Pope

Status: VU D2

Endemism: Endemic?

Distribution: North

Brachystegia woodland often in sandy soil. Type from Chishimba Falls in Kasama District. Possibly a Zambian endemic.

BORAGINACEAE

Cystostemon hispidissimus (S.Moore) Miller &

Riedl subsp. *zambiensis* Miller & Riedl

Status: VU D2

Endemism: Endemic

Distribution: West

Grows in Brachystegia woodland and edges of dry Brachystegia baehmii margins.

CAMPANULACEAE

Wahlenbergia ramossima (Hemsl.) Thulin subsp. *richardsiae* Thulin

Status: VU D2

Endemism: Endemic

Distribution: North

Damp grassland or sandy soil. Type from Mbala by Richards.

CAPPARACEAE

Maerua paniculata Wild

Status: VU B1B2C2

Distribution: North

Type is from Itigi thicket, Chishela Chikuku.

COLCHICACEAE

Gloriosa sessiliflora Nardal & Bingham

Status: VU D2

Endemism: Endemic?

Distribution: Barotseland

Known from a single population at the type locality. Many individuals are reported to be known from this locality. Found on floodplain termite mounds and sandbanks with riverine forest. Difficult to find, under Syzygium forest. Apparently also a site photo from Namibia, presumably from Caprivi, in the linear dune systems of the Kalahari dunes. Found on elevated parts of the Balazi Plain.

COMBRETACEAE

Combretum mweroense Baker

Status: VU D2

Endemism: Near-endemic?

Distribution: North

Semi-deciduous thicket in Chipya thicket (degraded Itigi that has been burnt). Scrambler in scrub. Possibly occurs in Tanzania and DRC.

Meiostemon tetrandrus (Exell) Exell & Stace subsp. *australis* Exell

Status: VU B1B2C

Distribution: South

Dense, low altitude deciduous thicket where Acacia is dominant. In Zambia, known from game ranches and National Parks where it is said to be threatened by elephants. Also recorded from Mozambique and Zimbabwe.

Meiostemon tetrandrus (Exell) Exell & Stace subsp. *tetrandrus*

Status: VU B1B2C

Distribution: North

In Itigi thicket, probably as widespread as Itigi thicket. Shallow sand covering granite. Extremely leached and infertile sands. Type is from Allan in Mwera Antipa. Apparently also recorded in East Africa.

CONNARACEAE

Burtia prunoides Baker f. & Exell

Status: VU B1B2C

Endemism: Near-endemic?

Distribution: North

An endemic to Itigi thicket in northern Zambia.

CONVOLVULACEAE

Ipomoea richardsiae Verdc.

Status: VU D2
Endemism: Endemic
Distribution: West

In woodland on rock outcrops. Altitude of 1,200–1,300 m. Type is from Kolendo Vilage in Mwinilungo. Apparently not known from elsewhere.

CUCURBITACEAE

Cucumis humifructus Stent

Status: VU D2
Distribution: North, Barotseland
In swamp forests but also reported on Kolohori sands which needs verification.

EUPHORBIACEAE

Clusia whytei Hutch. var. *monticoloides* Radcl.-Sm.

Status: VU D2
Endemism: Endemic
Distribution: North

Known only from this oreo. Higher rainfall plateau grassland.

Croton scheffleri Pax

Status: VU D2
Distribution: North

Euphorbia debilisipina L.C.Leach

Status: EN B1B2C
Endemism: Endemic
Distribution: Central
Known only from limestone outcrops (small oreo of endemism). Quarrying and urban expansion have resulted in habitat loss.

Euphorbia distinctissima L.C.Leach

Status: VU D2
Endemism: Endemic
Distribution: North

Euphorbia fanshawei L.C.Leach

Status: VU
Endemism: Endemic
Distribution: North
Reported to be rare.

Euphorbia perplexa L.C.Leach var. *kasamana* L.C.Leach

Status: VU D2
Endemism: Endemic?
Distribution: North

Euphorbia speciosa L.C.Leach

Status: VU D2
Endemism: Endemic
Distribution: North

Jatropha seineri Pax var. *tomentella* Radcl.-Sm.

Status: EN B1B2C
Endemism: Endemic
Distribution: Central, South
Soils derived from carbonate rocks.

Monadenium discoideum Bally

Status: VU D2
Source: IUCN TPC (1981).

Monadenium filiforme (Bally) S.Carter var. *filiforme*

Status: VU D2
Distribution: North
Source: IUCN TPC (1981).

Monadenium friesii N.E.Br.

Status: VU B1B2c
Endemism: Endemic
Distribution: Central

Miombo woodland, very inconspicuous, easily overlooked. Occurs in a variety of habitats. Also on limestone areas not likely to be cultivated. Is endemic to a small oreo in Lusoko and Chisombo, where it is fairly common (60 km north of Lusoko).

Monadenium hirsutum Bally

Status: VU D2
In miombo woodland.

Monadenium pseudoracemosum Bally var.

lorifolium Bally
Status: VU D2
Source: IUCN TPC (1981).

Monadenium pudibundum Bally var. *pudibundum* Bally

Monadenium simplex Pax var. *pudibundum* (P.R.O.Bally)
P.R.O.Bally
Status: VU D2
Endemism: Endemic
Distribution: West
Type from Mwinilungo.

Tragia micromeres Radcl.-Sm.

Status: VU
Distribution: North
Disturbed by human settlements. Type from Lake Bongweulu on fixed dunes.

Tragia prostrata Radcl.-Sm.

Status: VU D2
Endemism: Endemic
Distribution: North
Known only from the type locality. Higher rainfall miombo, chipyo and tall grassland.

Tragiella friesiana (Prain) Pax & Hoffm.

Status: VU D2
Endemism: Endemic
Distribution: North
Type from Mporokoso. Higher rainfall miombo woodland.

FABACEAE

Aeschynomene lateriticola Verdc.

Status: VU D2
Endemism: Endemic
Distribution: West
Known only from the type in Mwinilungo (collected in 1938 by Milne-Redhead). Is a perennial prostrate herb. Found in open grassland, overlying lateritic soil.

Aeschynomene stipulosa Verdc.

Status: VU D2
Endemism: Endemic
Distribution: West
Is a perennial prostrate herb, known only from the type locality in Mwinilungo (on a river bank), collected by Milne-Redhead (1937). Brachystegia woodland species. Possibly known only from the type.

Aeschynomene venulosa Verdc. var. *grandis* Verdc.

Status: VU D2
Endemism: Endemic
Distribution: North
Known only from Mbalo from two specimens. Both were collected by Richards along a 200 m gradient, at different times. Woodland and short grassland species.

Azelia bipindensis Harms

Status: VU D2
Distribution: West
Apparently known only from one locality in Zombio (Mwinilungo). Widespread in West Africa. Commonly used as a timber tree.

Aphanocalyx trapnellii (J.Léonard) Wieringa

Status: VU D2
Endemism: Endemic
Distribution: North
Known only from a small oreo. It is a medium-sized tree

that forms almost monospecific stands. Is used in the building industry.

Baikiaea plurijuga Harms

Status: VU A1acd
Wide distribution but threatened due to heavy logging of the species.

Baphia speciosa Gillett & Brumm.

Status: VU D2
Endemism: Endemic
Distribution: North
Conspicuous 7 m tall tree. Itigi thicket mosaic of grassland and scrub.

Bussea massaiensis (Taub.) Harms subsp.

rhodesica Brenan
Status: VU B1B2c
Endemism: Near-endemic?
An endemic to Itigi thicket in northern Zambia.

Crotalaria criniramea Bakerf. ex Polhill

Status: VU D2
Endemism: Endemic
Distribution: West
From a well-collected oreo. Altitude 1,300–1,500 m

Crotalaria simoma Polhill

Status: VU D2
Endemism: Endemic?
Distribution: North
It was collected twice at the same locality. This is not a well-collected species.

Crotalaria trinervia Polhill

Status: VU D2
Endemism: Endemic
Distribution: North, West
First collected in Mwinilungo, a well-collected oreo. Brachystegia woodland.

Dalbergia melanoxylon Guill. & Perr.

Status: VU A1d
Distribution: Central/East
Widespread in Zambia. Unhealthy populations in Luangwa. Also recorded from Angola, Botswana, Central African Republic, DRC, Ethiopia, Kenya, Malawi, Mozambique, Namibia and others.

Daniellia alsteeniana Duvin.

Status: EN A1acd
Distribution: North
Grows in dry evergreen forest and high quality miombo woodland (deep soil miombo woodland). Used for canoes. Large numbers are being cut down in Mporokoso. Many sites have been extirpated.

Droogmansia pteropus (Baker) De Wild. var. *axillaris* Verdc.

Status: VU D2
Endemism: Endemic
Distribution: North
It is recorded from two collections in Mbalo (two localities in close proximity to each other). Species grows in grassland and open dambos.

Humularia kapiensis (De Wild.) Duvin. var. *repens* Verdc.

Status: VU D2
Endemism: Endemic
Distribution: West
Collected twice in Mwinilungo in 1960 (Robinson) and 1969 (Tronche). A conspicuous plant although it is prostrate. The habitat is dry, sandy plateau grassland at 1,500 m.

Humularia minima (Hutch) Duvin. subsp. *flabelliformis* (Duvin.) Verdc.

Status: VU D2
Endemism: Endemic
Distribution: North
Known only from the type locality, was never recorded there again despite the oreo being fairly well-collected. It could be that it is very rare.

Humularia minima (Hutch) Duvign. subsp. minima
Status: VU D2
 Endemism: Endemic
 Distribution: North, West
 Collected by Milne-Redhead (1930s). Found in Mbala (collected by Burt in 1936). Mainly Brachystegia woodland in Kalahari sand.

Humularia pseudoeschymene Verdc.
Status: VU D2
 Endemism: Endemic
 Distribution: West
 Well-collected area. Watershed grassland on Kalahari sand.

Indigofera emarginella Steud. ex A.Rich. var. langeifolia Gillett
Status: VU D2
 Endemism: Endemic
 Distribution: North
 Type is from Mbala. Open woodland or bush amongst grass.

Katschya africana Endl. var. latifolia Verdc.
Status: VU D2
 Endemism: Near-endemic
 Distribution: East
 Type is from near the top of Kagampande Mountain. Grows up to 6 m tall. Conspicuously glandular and sticky. Also known from Molowi.

Katschya langilaba Verdc.
Status: VU D2
 Endemism: Endemic
 Distribution: North
 The type was collected in 1950. Habitat is floodplains in wet black soils.

Katschya suberifera Verdc.
Status: VU D2
 Endemism: Endemic
 Distribution: West
 Known only from Kaleni Hill which has been well-collected. The species has been described as being dominant over a small area. Shrub of 2 m.

Ophrestia brevircemasa Verdc.
Status: VU D2
 Endemism: Endemic
 Distribution: West
 In Upaka woodland at altitude of 1,500 m. Known only from the collection of Drummond & Williamson 9307 (1969).

Pseudoprasapis fischeri (Taub.) Harms
Status: VU B1B2c
 Endemism: Endemic?
 Distribution: North
 It is thick and endemic. An important constituent in dense thicket. Altitude of 760–1,000 m. Habitat under threat. Not known whether it is endemic to Zambia.

Tephrosia kasikiensis Bakerf. subsp. chinsalana Brummitt
Status: VU D2
 Endemism: Endemic
 Distribution: North
 Specimen was collected along a shady riverine habitat. The type is from Shiwa Ngandu.

Vigna camasa Baker subsp. abercarnensis Verdc.
Status: VU D2
 Endemism: Endemic?
 Distribution: North
 In rocky places, altitude 1,200–2,000 m. Type from Mbolo on the path to the Inana Saurce (collected by Richards). Narrow distribution range.

GENTIANACEAE

Canscra kirkii N.E.Br.
Status: VU D2

Endemism: Near-endemic
 Distribution: South
 Edges of rainforest and at the end of the spray zone of waterfalls. The type collection is from an island in Victoria Falls, between Zambia and Zimbabwe. It is known to be uncommon.

Faraa carniculata P.Taylor
Status: VU D2
 Endemism: Endemic
 Distribution: North
 Rack crevices at altitude of about 1,500 m.

Sebaea perpusilla Paiva & Nogueira
Status: VU D2
 Endemism: Endemic
 Distribution: Barotseland, West
 Collected in a wet damba. Type from Sinkabala Dambo in Mwinilunga. Possibly known only from the type.

HYPOXIDACEAE

Curculiga multiflora Zimudzi
Status: VU D2
 Endemism: Endemic
 Distribution: West
 This species is known only from the type locality. It is larger than Hypoxis.

Hypoxis dregei (Baker) Nel.
Status: VU A2cd
 Endemism: Near-endemic?
 Distribution: North, West
 Wide distribution.

Hypoxis fischeri Pax
Status: EN A2cd
 Endemism: Endemic?
 Distribution: West
 Sandy open places and miamba woodland.

Hypoxis gaetzel Harms
Status: EN A2cd
 Distribution: East, West, Central
 Plateau woodland and damba margins.

Hypoxis iridifolia Baker
Status: VU A2cd
 Endemism: Endemic?
 Distribution: Barotseland, Central, West
 Habitat is sandplain and miamba woodland.

Hypoxis villasa L.f.
Status: VU A2cd
 Distribution: Central, Barotseland, North

IRIDACEAE

Gladialus serenjensis Goldblatt
Status: VU D2
 Endemism: Endemic?
 Distribution: Central, North
 On rocky outcrops and on thin soils in rack crevices. In hill country. Restricted to a small area. Known from two cited collections in Zambia.

MELASTOMATACEAE

Memecylon zambeziense A. & R.Fern.
Status: VU D2
 Endemism: Endemic?
 Distribution: North
 Only from Zambia in gallery forests along the Zambezi. Fairly conspicuous shrub of 4 m. Type from Mwinilunga District collected by Angus.

MORACEAE

Antiaris toxicaria Lesch. subsp. welwitschii (Engl.) C.C.Berg var. usambarensis (Engl.)

C.C.Berg
Status: VU C2a
 Distribution: North
 Zambia is the only country in the Flora zambesiaca region where it is found in evergreen, riverine habitats. This species is known only from Samfyo on Lake Bangweulu in isolated, evergreen forests.

Ficus usambarensis Warb.
Status: VU D2
 Distribution: North
 There is an isolated occurrence from the main centre in Usamboro (Tanzania). Big, conspicuous tree found in disturbed woodland.

Milicia excelsa (Welw.) Berg
Status: CR C2b
 Distribution: North
 Can grow up to 20–50 m tall. It is a tropical African genus consisting of two species. Commonly called eroco timber. It is a highly desirable, high-value timber species. Appeared in previous RDLs as globally LR-nt. Heavily utilised in Zambia.

MYRSINACEAE

Embelia upembensis Taton
Status: VU B1B2c
 Distribution: South
 Grows in Brachystegia woodland. Also known from DRC.

OLEACEAE

Chiananthus richardsiae Stearn
Status: VU A1a
 Endemism: Endemic?
 Distribution: North
 Grows in sandy and stony soils.

ORCHIDACEAE

Brochocarythis canica (Summerh.) Summerh. subsp. langilabris Summerh.
Status: VU D2
 Endemism: Endemic?
 Distribution: West
 Grassy savanna and in dry sandy dambos. Fusiform tubers. Altitude of 1,300–1,400 m. Type is from Mwinilunga by Milne-Redhead. Possibly found outside Zambia but this cannot be confirmed.

Disa nyikensis H.P.Linder
Status: VU D2
 Endemism: Near-endemic?
 Distribution: East
 Grows in montane grasslands at 2,500 m. Recorded from Malawi.

Disa roeperacharoides Kraenzl.
Status: VU D2
 Distribution: Central, West
 Found in damba grasslands but rarely from Brachystegia woodland. It is found in a variety of habitats. Probably used for chikanda. Wide distribution range. Also known from DRC.

Disa ukingensis Schltr.
Status: VU D2
 Distribution: East
 Montane short dry grassland. Altitude 2,100–2,800 m. Wide distribution.

Disperis aphylla Kraenzl. subsp. bifolia Verdc.
Status: VU D2
 Distribution: East
 In leaf litter in deep shade in evergreen forest. Probably overlooked as it is a small plant.

Disperis bifida P.J.Cribb
Status: CR B1B2c
 Endemism: Endemic

Distribution: East
In a small forest patch, near Rest House (Nyiko Plateau). Probably overlooked as it is a small plant.

Habenaria hebes la Croix & P.J.Cribb
Status: EN A2dB1B2e
Endemism: Endemic
Distribution: West
Seasonally damp grassland (on sandy plateau grassland). Probably used as chikando.

Habenaria pasmithii G.Will.
Status: VU D2
Distribution: West
Water meadows of slow flowing water 60 cm deep. Grows with sedges and aquatic herbs. Found on Kolohori sands. Type from Okovongo in Botswana. Known from only two collections. Probably more common than currently known.

Habenaria pubidens P.J.Cribb
Status: VU A2c
Endemism: Near-endemic
Distribution: East
Deep shade in evergreen forest. Altitude of 1,700–2,050 m in inaccessible areas. Forms colonies. Used on both sides of the border (also known from Malawi). Narrow distribution range. Big tubers. Probably used as chikondo.

Habenaria tubifolia la Croix & P.J.Cribb
Status: EN A2dB1B2e
Endemism: Endemic
Distribution: North
Open bush with Uapaca trees in a commercial forming area (mostly now abandoned land). Only known from the type specimen. Probably used as chikondo.

Halathrix tridactylites Summerh.
Status: VU D2
Distribution: East
Dry montane grassland, usually recently burnt. Altitude 2,050–2,300 m. Probably overlooked.

Malaxis katangensis Summerh. var. pygmaea (Summerh.) P.J.Cribb
Status: VU D2
Endemism: Near-endemic
Distribution: West
Found in woodland. Only one citation in Flora zambesiaca, Mwinilungo (1938) by Milne-Redhead. Probably used as chikondo. Probably overlooked because of size.

Platycoryne brevirastris Summerh.
Status: VU D2
Endemism: Near-endemic
Distribution: West
Dombos and granite outcrops over marshy ground over laterite or rock. Kolendo Dombo (Mwinilungo) is the type locality. Also in Angola.

Satyrium micracarys Schltr.
Status: VU A2dD2
Distribution: East
Montane grassland, usually amongst rocks in seepage areas. Altitude of 1,900–2,300 m. Type from Tanzania. Very large tubers.

Satyrium manadenum Schltr.
Status: VU A2dD2
Distribution: East
Habitat is wet montane grassland usually in wetter areas. Altitude more than 2,100 m. The species sometimes forms large colonies. Type from Tanzania. Definitely used as chikanda, based on the size of the tuber.

Satyrium princeae Kraenzl.
Status: VU D2
Distribution: East
Found in montane grassland, usually in wetter areas, at an altitude of 1,900–2,400 m. Type from Tanzania.

Satyrium shirensense Rolfe
Status: VU A2d
Distribution: East
In montane grasslands, rocky hillsides and seepage slopes. Altitude of 1,750–2,500 m. Type from the Shire Highlands in Malawi. Widely distributed. Small, slender plants. White flowers. Very common and ubiquitous.

OXALIDACEAE

Biophytum nyikense Exell
Status: VU D2
Endemism: Endemic
Distribution: East
Upland grassland, altitude up to 2,450 m. Type is from the Nyiko Plateau (Zambia). Known from a very small area on the Nyiko in Zambia.

Biophytum richardsiae Exell
Status: VU D2
Endemism: Endemic
Distribution: North
On cliff ledges. Type from the Saisi (a basin on its own) by Richards. Apparently known only from the type.

PASSIFLORACEAE

Adenia erecta De Wilde
Status: VU D2
Endemism: Endemic
Distribution: West
Type is from the Mujileshi River (Mwinilungo). Found in grassland at the edge of rivers and in Brachystegia woodland. Possibly occurs in Angola. No further information available.

Adenia tuberifera R.E.Fr.
Status: VU D2
Endemism: Endemic
Distribution: North
Type from Kolomba Falls. Apparently known only from here. In open woodland and stony places in dry forests.

POACEAE

Eragrostis punctiglandulosa Cope
Status: VU D2
Endemism: Endemic
Distribution: South
Grows in heavy black clay soils (the whale of the Kafue Flots). Kafue is succumbing to habitat degradation. The type is from Nomwolo District, along the Kafue River. Is a Kafue Flots endemic.

Oreobambas buchwaldii K.Schum.
Status: CR A1acdB1B2ceB3d
Distribution: North
Grows in mist forests. Has been extensively over-utilised. Is known from a few localities, but appears to be extinct at most of the sites. Recent surveys have failed to find it in the Mbalo area. The species has been observed in cultivation.

POLYGALACEAE

Securidaca welwitschii Oliv.
Status: VU B1B2C
Distribution: West
Evergreen riparian forests. Habitat type is threatened. The tree is used for medicinal (aspirin) and cosmetic purposes. Known from West and East Africa.

PROTEACEAE

Pratea caffra Friis subsp. mafingensis Chisumpa & Brummitt
Status: VU D2
Endemism: Near-endemic

Distribution: East, North
Altitude of 2,070–2,240 m. Known from the Zambia-Nyiko and the Mafingos. Originally endemic to Malawi.

Pratea kibarensis Hauman subsp. cuspidata (Beard) Chisumpa & Brummitt
Status: VU D2
Endemism: Endemic
Distribution: North
Upper Brachystegia woodland and mountain grasslands of 1,800–2,000 m. Type from Mafingo Mountains above Chisengo. Not known whether it is endemic to Zambia.

RHIZOPHORACEAE

Cassipourea fanshawei Torre & Gonç.
Status: VU D2
Endemism: Endemic
Distribution: North
Only known from the type collection. The site is ungozzetted. The species grows in thickets.

RUBIACEAE

Coffea mufindiensis Hutch. ex Bridson subsp. lundaziensis Bridson
Status: VU D2
Endemism: Near-endemic
Distribution: East
The species grows in forest undergrowth and forest fringes at altitudes of 2,050–2,300 m. Also found in Tanzania.

Fadagia chlarantha K.Schum.
Status: VU D2
Endemism: Near-endemic
Distribution: Barotseland, West
Sandy plains at edges of Cryptosepalum woodlands, Kolahari sand species at 1,200 m altitude. Grassy plains and Baikiaea woodland. Also recorded in Angola.

Fadagia schmitzii Verdc.
Status: VU D2
Distribution: West
Cryptosepalum–Brachystegia woodland in Kolohori sand, 1,200 m. Type is from Mwinilungo collected by Milne-Redhead. Is a suffrutex of height 35–50 cm. Also recorded from DRC.

Fadagia varifolia Robyns
Status: VU D2
Endemism: Endemic
Distribution: West
Found in open sandy ground on plain and woodland edges. Should have been collected again (common?).

Hallea stipulacea (DC.) Leroy
Status: VU A1cd
Distribution: Central, North
Found in swamp forest, fringing woodlands of streams and lakes. Alternative genus name: Metrogyna. Locally called 'mupo' (Bemba name). Timber tree of high rainfall areas. Also recorded in Angola, Cameroon, Central African Republic, DRC, Gabon, Ghana, Guinea, Nigeria, Senegal, Sierra Leone and others.

Oldenlandia geophila Bremek.
Status: VU D2
Endemism: Endemic
Distribution: West
Sandy dombos margins and drainage banks. Type from Mfuliro.

Pavetta jahnstanii Bremek. subsp. brevilaba Bridson
Status: VU B1B2bD2
Distribution: North
Also known from Tanzania.

Pavetta redheadii Bremek.
Status: VU B1B2cD2
Endemism: Endemic

Distribution: West
Evergreen vegetation, riparian thicket and woodland.
Altitude of 1,230 m. Type from the Lungu River. Forest has been drastically transformed for banana and sugarcane plantations. Not known whether it is endemic to Zambia.

Pavetta subumbellata Bremek. var. *subumbellata*
Status: VU D2
Distribution: East
Forest patches at altitude of 1,750–2,285 m. Type from Tanzania.

Pentanisia confertifolia (Baker) Verdc.
Status: VU D2
Endemism: Endemic?
Distribution: North
Coarse grassland and Brachystegia woodland, sometimes amongst boulders on sandy ground and also in old cultivations. Altitude of 1,500–1,650 m. All collections within a very small area. Type from Lake Tongonyiko (Fwombo) collected by Carsan. Possibly also in Tanzania.

Psychotria mwinilungae Verdc.
Status: VU D2
Endemism: Endemic
Distribution: West
Riverine forest endemic, altitude of 1,300 m. Type is from Mwinilunga on the West Lungu River (collected in 1975). Should have been found there again. Is a subshrub. Habitat is threatened.

Psydrax whitei Bridson
Status: VU D2
Endemism: Near-endemic?
Distribution: North, East
Evergreen rainforest and forest margins, on rocky outcrops in submontane grasslands. Altitude of 2,100–2,300 m. Type is from Molwi-Nyiko Plateau. In Zambia the known localities are in close proximity to each other (highlands).

Rytigynia adenodonta (K.Schum.) Robyns subsp. *adenodonta*
Status: VU B1B2b
Distribution: North, Central
Severely fragmented habitats.

Rytigynia adenodonta (K.Schum.) Robyns subsp. *reticulata* (Robyns) Verdc.
Status: VU B1B2b
Distribution: East
Only one record in Zambia at an altitude of 1,177–2,000 m.

Spermacoce annua Verdc.
Status: VU D2
Endemism: Endemic?
Distribution: West
Dry dombos, damp soil on rocky outcrops. Altitude of 1,500 m. Type is from near Koleni Hill in Mwinilunga by Robinson. Possibly known only from the type.

Spermacoce bangweolensis (R.E.Fr.) Verdc.
Status: VU D2
Endemism: Endemic
Distribution: North
Found on bare soil amongst grass clumps. Almost certainly a dune species. Type from Lake Bangweulu. Found on both sides of the lake. Sub-shrub up to 50 cm tall. Habitat disturbed due to the development of the fishing industry.

Spermacoce perennis Verdc. var. *fimbriolata* Verdc.
Status: VU D2
Endemism: Endemic
Distribution: North
Dombos and bushland on sandy soil. Type from Luwingu (Chishinga Ranch) by Astle (1961). Same habitat as *Spermacoce perennis* Verdc. var. *perennis*.

Spermacoce perennis Verdc. var. *perennis*
Status: VU D2
Distribution: North
Dombos and bushland on sandy soil. Type collected in Luwingu by Jelf (1922).

RUTACEAE

Vepris termitaria Mendonça
Status: VU B1B2C D2
Distribution: West
On termite mounds in woodland. An evergreen shrub or small tree up to 3 m. Type is from Kitwe; collected by Fanshawe. Not common and not in dense stands. Distribution scattered.

SAMYDACEAE

Homalium molle Stapf
Status: VU D2
Distribution: North
Type is from from Kunkuto in Mporokosa District. In forest margins and forest patches. Unable to confirm whether it is endemic to Zambia.

SCROPHULARIACEAE

Buchnera chisumpae Philcox
Status: VU D2
Endemism: Endemic
Distribution: North
Grows amongst rocks in dry sandy areas at altitudes of 1,260–1,750 m. There are several localities in Kasoma.

Buchnera cryptocephala (Baker) Philcox var. *mwinilungensis* Philcox
Status: VU D2
Distribution: West
Habitat is Brachystegia woodland. The species was lost collected in 1960. Also recorded in DRC.

Buchnera ebracteolata Philcox
Status: VU D2
Endemism: Endemic
Distribution: North
Habitat of the species is open grassland and woodland at altitudes of 1,750–2,500 m. Found in large quantities in Chilongwelo.

Buchnera nervosa Philcox
Status: VU D2
Endemism: Endemic
Distribution: North
Grows in dambas in sandy areas where it is common. Also known from semi-open woodland. Occurs at an altitude of about 1,300 m.

Crepidiorhapon involucratum (Philcox) Fischer
Status: VU D2



Participants of the RDL Workshop held in Lusaka.
(Photo: J.S. Golding)

Endemism: Endemic?
Distribution: West
Woodlands, roadsides and stony areas in and bordering gorges. Type from Kabompo Gorge, collected by Robinson.

Crepidiorhapon tenuifolius (Philcox) Fischer
Status: VU D2
Distribution: North
Bogs, swamps and marshy grounds. Altitude of 1,250–1,550 m. Type is from Chilangwelo.

Micrargeriella aphylla R.E.Fr.
Status: VU D2
Endemism: Endemic
Distribution: North
Swamps and dombos, altitude of 1,290–1,525 m. Type from Kowendimusi.

Stemodiopsis glandulosa Philcox
Status: VU D2
Distribution: Central
Grows on rock faces and crevices at an altitude of 1,280 m. Type from Serenje collected by Fanshawe. Known only from a small area in Zambia.

SELAGINELLACEAE

Selaginella imbricata (Forssk.) Spring ex Decne.
Status: VU D2
Scarce in southern Africa; always occurs as a basol.

TURNERACEAE

Streptopetalum luteoglandulosum R.Fern.
Status: VU D2
Endemism: Endemic
Distribution: North
Grassland on sandy soils. Type is from Luopulo by Richards.

VITACEAE

Cyphostemma abercornense Wild & R.B.Drumm.
Status: VU D2
Endemism: Endemic
Distribution: North
Habitat is rocky hills. Represented only by two collections.

Cyphostemma rotundistipulatum Wild & R.B.Drumm.
Status: VU D2
Endemism: Endemic
Distribution: North
Grows in Brachystegia woodland in sandy soils. A specimen has been collected from a termite mound in the middle of a marsh.

LOWER RISK

AMARANTHACEAE

Pandiaka confusa C.C.Towns.

Status: LR-lc

Distribution: West

Type is from Mwinilunga just south of Matanchi Farm. Also recorded from Angola.

Pandiaka richardsiae Suess.

Status: LR-lc

Endemism: Endemic

Distribution: North

In damp sandy ground, along dambas or in short grass under Uapaca or Protea stands.

ANACARDIACEAE

Lannea virgata R. & A.Fern.

Status: LR-lc

Endemism: Endemic

Distribution: West, Barotseland

Woodlands, sometimes near dambas and an termite mounds. Type from Kasempa by Fanshawe. Very wide distribution.

Ozoroa kassneri (Engl. & v.Brehm.) R. & A.Fern.

var. *rhodesica* R. & A.Fern.

Status: LR-lc

Endemism: Endemic

Distribution: Central, North

Type is from Ndunda in Mbala by Richards.

Rhus longipes Engl. var. *schinoides* R.Fern.

Status: LR-lc

Endemism: Endemic?

Distribution: North

Brachystegia woodland and by streams. Type is from 13 km northwest of Mbala. Known only from the type collection.

APOCYNACEAE

Strophanthus angusii F.White

Status: LR-lc

Distribution: Barotseland, West

Habitat at edge of dambo in Kalahari sand. Type from Chikundulu Stream in Mwinilunga District. Is a suffrutex. Reasonably widespread.

ASCLEPIADACEAE

Stapelia gigantea N.E.Br.

Status: LR-nt

Distribution: Central

Widely distributed outside Zambia.

ASTERACEAE

Vernonia mushituensis Wild

Status: LR-lc

Endemism: Endemic?

Distribution: North

Mushitu forest margins. Type from Chilongawela. Wind-dispersed seed. Possibly endemic to Zambia.

Vernonia tanganyikensis R.E.Fr.

Status: LR-lc

Distribution: North

Miamba woodland. Type from Lake Tanganyiko. Also known from East Africa.

BALSAMINACEAE

Impatiens limnophila Launert

Status: LR-lc

Endemism: Endemic

Distribution: North

In wet places in swamps, in mud on river banks. Type from Mbala collected by Weelan. Flower colour pale mauve or pink. It has great range of variability in its vegetative stages. A prostrate plant.

CAPPARACEAE

Boscia cauliflora Wild

Status: LR-lc

Endemism: Endemic?

Distribution: West

Termite mounds in Brachystegia woodland. Type is from Mwinilunga collected by Milne-Redhead in 1938. Taxonomically possibly sunk.

Cleome macrophylla (Klotzsch) Briq.

Status: LR-nt

Distribution: Central, South

This is a mid-Zambezi endemic which occurs on Kalahari soils. Small, discrete packets of distribution. Grazing by cattle a threat.

CLUSIACEAE

Garcinia pachyclada N.Robson

Status: LR-lc

Endemism: Endemic

Distribution: North

Widespread on plateau woodland on sandy soil.

CONVOLVULACEAE

Ipomoea fanshawei Verdc.

Status: LR-lc

Distribution: Barotseland

Woodlands, dambo margins and open sand habitats. Altitude of 1,097 m. Apparently also recorded from Botswana.

EUPHORBIACEAE

Croton longipedicellatus Léonard var.

brevipedicellatus Radcl.-Sm.

Status: LR-nt

Endemism: Near-endemic?

Distribution: North, West

Seldam collected. Type from Lake Mweru. Possibly also in Angola.

Croton polytrichus Pax subsp. *brachystachys*

Radcl.-Sm.

Status: LR-lc

Endemism: Endemic

Distribution: North, South, West

In dry thicket.

Phyllanthus caespitosus Brenan

Status: LR-lc

Endemism: Endemic?

Distribution: North, West

Pyrophyte. Type from Kasama. Plateau miamba woodland. Not known whether it is endemic to Zambia.

Phyllanthus microdendron Welw. ex Mull.Arg. var.

asper Radcl.-Sm.

Status: LR-lc

Distribution: Barotseland, West

Last specimen cited was in 1975. Type from Kitwe.

Miamba and *Guibaurtia*-Baikiaea woodland on Kalahari sand. Altitude of 1,000–1,250 m. Also known from Angola.

Phyllanthus polyanthus Pax

Status: LR-lc

Distribution: Central, West

Habitat severely reduced. Dry evergreen forest and thicket patches. Well-represented outside Zambia. Apparently also recorded in South Africa.

Phyllanthus tenuis Radcl.-Sm.

Status: LR-lc

Endemism: Endemic

Distribution: North

Type from Mbala District where it is locally common. Sandy soil among racks and wet grassland.

Phyllanthus zambicus Radcl.-Sm.

Status: LR-lc

Distribution: Central, North

Type from Zambia, Kafue National Park (Chungo). Floodplain grassland and mopane woodland.

FABACEAE

Aeschynomene pseudoglabrescens Verdc.

Status: LR-lc

Endemism: Endemic

Distribution: North, West

Collected in Kosama by Richards. The two known localities are very far apart, and the species has probably been overlooked. Habitat is Brachystegia woodland at 1,200 m.

Brachystegia puberula Burtt Davy & Hutch.

Status: LR-lc

Distribution: West

Has been overlooked. Common and widespread.

Cordyla africana Lour.

Status: LR-lc

Distribution: Central/East, North, South

In small numbers in Luangwa mostly as mature trees (one individual every 2–3 km). The species is common throughout the rest of Zambia, and its habitat is not severely disturbed.

Crotalaria umbellifera R.E.Fr.

Status: LR-lc

Endemism: Endemic

Distribution: North, West

Widespread.

Dialium angolense Welw. ex Oliv.

Status: LR-lc

Distribution: Central, North, West

Widespread in Zambia. Grows as part of mateshe forest, associated with Itigi thicket. Found in riverine fringes.

Kotschyia prittwitzii (Harms) Verdc. var. *parviflora* Verdc.

Status: LR-lc

Endemism: Endemic

Distribution: North, West

It probably has a much wider distribution than currently known. The type is from Kawambwa, collected by Fanshawe. Riverside Brachystegia woodland.

Tephrosia coronilloides Welw. ex Baker

Status: LR-lc

Distribution: South

It is recorded from sandy places on Kalahari sand. Type from Angola. Widespread. There are probably several more localities because the habitat is extensive.

Tephrosia richardsiae Gillett subsp. *erucifera*
Brummitt
Status: LR-lc
 Endemism: Endemic
 Distribution: North
 Rocky plateau woodland, a common habitat. Occurs on rocky hills in undisturbed areas. Widespread along the Great North Road.

GENTIANACEAE

Exacum oldenlandioides (S.Moore) Klackenb.
Status: LR-nt
 Habitat is along streams and river banks. Widespread. Well-represented outside Zambia.

GESNERIACEAE

Streptocarpus aff. *michelmerei* Hilliard & B.L.Burtt
Status: LR-lc
 Endemism: Endemic
 Distribution: Central, West
 Found in deep gorges and inaccessible areas. Known from several localities. Characterised by its unifoliate leaves. Similar-looking taxon in Malawi (*Viphya*). Known from the specimens of Mutimushi 3335 (1965) and Williamson 1727 (1969).

HYPOXIDACEAE

Curculigo pilosa (Schum. & Thonn.) Engl.
Status: LR-lc
 Endemism: Endemic
 Distribution: Central, North, South
 It grows among rocks, crevices and in dambos. It is probably used for its medicinal properties as an alternative to African Potato.

IRIDACEAE

Moraea brevifolia Goldblatt
Status: LR-lc
 Endemism: Endemic
 Distribution: North, West
 Marshy habitats. The type is Lumangwe Falls in Mporokoso District.

LOBELIACEAE

Monopsis stellarioides (Presl) Urb.
Status: LR-lc
 Distribution: North
 Widespread. Habitat in Lumangwe is about to be destroyed because of the development of a hydroelectric scheme.

MALVACEAE

Triplachiton zambesiacus Milne-Redh.
Status: LR-lc
 Distribution: West
 Found on termite mounds, but also in floodplains on silty sands and on riverbanks. Restricted to the valley floor. Mid-Zambezi endemic. Type is from Zimbabwe. Wood is hard and is used for yokes.

MELASTOMATACEAE

Dichaetanthera erici-rosenii (R.E.Fr.) A. & R.Fern.
Status: LR-lc
 Distribution: North
 Found in rocky places mainly at waterfalls and in woodlands. Also recorded from Tanzania.

Dissotis simonis-jamesii Buscal. & Muschl.
Status: LR-lc
 Endemism: Endemic
 Distribution: North
 The species was collected at Lake Bengweulu up to Mbala. It is known only from swamps in northern Zambia. The range covers a wide area. Habitats are not under threat.

MELIACEAE

Khaya anthotheca (Welw.) C.DC.
Status: LR-nt
 Known from gorges. Wide distribution, only an Kalahari sand of the Western Province. Riparian and chipya forests. Popular as a cultivated tree. Also known from Angola, Cameroon, Ivory Coast, DRC, Ghana and others.

Turraea zambesia Sprague & Hutch. ex Hutch.
Status: LR-nt
 Distribution: West

MENYANTHACEAE

Nymphoides tenuissima A.Raynal
Status: LR-lc
 Distribution: North
 Temporary pools, altitude of 900–1,200 m. Also known from DRC.

MORACEAE

Ficus ottoniifolia (Miq.) Miq. subsp. *macrocyce*
Berg
Status: LR-lc
 Extremely widespread. Habitat in riverine forests in rocky gorges; on rocks in rapids and in swamp forest mushitu.

Morus mesozygia Stapf ex A.Chev.
Status: LR-nt
 Distribution: North, East
 This is the only African species in the genus. It grows up to 40 m tall. It is not known whether this species is endemic to Zambia. Not common. Wide distribution in Zambia and other countries.

ORCHIDACEAE

Brachycorythis pilosa Summerh.
Status: LR-lc
 Distribution: North, West
 Scrub and woody grassland and swamp. Type from Tanzania. Widespread.

Disa dichroa Summerh.
Status: LR-lc
 Endemism: Endemic?
 Distribution: North, West
 Known from many collections from Mbala. Possibly found in Tanzania.

Disa welwitschii Rchb.f. subsp. *welwitschii*
Status: LR-nt
 Grows in damp grasslands and dambos, common where it occurs.

Habenaria argentea P.J.Cribb
Status: LR-nt
 Endemism: Endemic
 Distribution: North, West, Central
 In swampy grassland. Seems widespread. Probably used as chikanda.

Habenaria hirsutitrunci G.Will.
Status: LR-nt
 Endemism: Near-endemic?
 Distribution: North, East
 Montane grassland. Probably used as chikanda.

Widespread. Type from Luangwa River, 50 km south of Mporokoso near the Kalungwishi River. Also known from Malawi.

Habenaria humilior Rchb.f.
Status: LR-nt
 Distribution: Central, South, East
 Altitude of 1,900–2,200 m in grassy dambos.

Habenaria leucotricha Schltr. var. *reticalcar* la Croix
Status: LR-nt
 Endemism: Endemic
 Distribution: West, North, Central, East
 Woodland on stony ground. Has a vast habitat range. Probably used as chikanda.

Habenaria velutina Summerh.
Status: LR-nt
 Endemism: Endemic
 Distribution: Central, North
 In grassland often near streams. Widespread distribution. Common habitat. Probably used as chikanda.

Nervilia bicarinata (Bl.) Schltr.
Status: LR-lc
 Distribution: North, Central, South
 Riverine forest. Not harvested. Also in Senegal, Yemen, Ethiopia, Rwanda, Tanzania, DRC and West Africa, Nigeria, Central African Republic, Madagascar, Mascarenes, Comores and so forth.

Platycoryne isoetifolia P.J.Cribb
Status: LR-nt
 Endemism: Endemic
 Distribution: North, East
 Wet and dry dambos, altitude of 1,350 m. Does not seem to be used as chikanda because it has small tubers. Type from Shiwa Ngandu.

Platycoryne latipetala Summerh.
Status: LR-lc
 Endemism: Near-endemic
 Distribution: West
 Wet peaty swamps, altitude of 1,200–1,400 m. Type from Sinkabolo in Mwinilunga. Also in DRC.

Platycoryne micrantha Summerh.
Status: LR-lc
 Endemism: Near-endemic
 Distribution: West
 Marshy grassland. Type from Mwinilunga, west of Dobeka Bridge. Also recorded in Angola.

Platycoryne proteatrum (Rchb.f.) Rolfe var. *recurvirostrum* G.Will.
Status: LR-nt
 Endemism: Endemic?
 Distribution: North
 Low-lying black soils of peaty dambos and swamps. Locally dominant and widespread. Like an epiphyte in rotting grass mats. The genus is unlikely to be used for chikanda. Not known whether it is endemic to Zambia.

Platylepis glandulosa (Lindl.) Rchb.f.
Status: LR-lc
 Endemism: Endemic?
 Distribution: Central
 Swamp species in deep marshy forests. Flowers from December to February. Possibly overlooked due to its small insignificant flowers. Not known whether it is endemic to Zambia.

Roeperocharis wentzeliana Kraenzl.
Status: LR-lc
 Distribution: East
 Montane grassland in damp areas. Altitude of 1,700–2,440 m. Type is from Tanzania. Widespread. Known from a small area in Zambia. Possibly used as chikanda.

PASSIFLORACEAE

Adenia cissampeloides (Planch. ex Hook.) Harms
Status: LR-lc
Distribution: North
Type is from Kolambo Falls in Mbolo. On rocky slopes with Brachystegia woodland. Species is common and dominant.

Adenia ovata De Wilde
Status: LR-lc
Endemism: Endemic?
Distribution: West, North
Type is from Mufuliro on the Copperbelt. Brachystegia woodland on lateritic and sandy soils. Seems to be widespread. Not known whether it is endemic to Zambia.

Adenia repanda (Burch.) Engl.
Status: LR-nt
Endemism: Near-endemic?
Distribution: East
Kolohori sand endemic. Appears in the rainy season. Tourists are known to collect the plant. Generally uncommon in Zambia but wide distribution. Possibly more widespread along the Chobe/Zambezi Rivers.

Basananthe baumii (Harms) De Wilde var. **caerulescens** (A. & R.Fern.) De Wilde
Status: LR-lc
Distribution: Barotseland, West
Found in miombo woodlands. Dry woodland in open sandy ground. Also in Angola.

Basananthe holmesii R. & A.Fern.
Status: LR-lc
IUCN TPC (1981).

POACEAE

Brachiaria pungipes Clayton
Status: LR-lc
Endemism: Endemic?
Distribution: West
Grossland on sandy soils, at altitude of 1,500 m. Type from Dobeko Bridge in Mwinilungo. Fairly wide distribution. Possibly also in Angola and DRC.

Digitaria bidactyla Van der Veken
Status: LR-nt
Endemism: Endemic
Distribution: North
Grows in dambos and in wet sands at altitudes of 1,600–1,700 m. Known from several collections from only one locality. Not known from elsewhere.

Digitaria tenuifolia Goetgh.
Status: LR-nt
Endemism: Endemic
Distribution: North
Found in shallow depressions on flat racks (altitude of 1,400 m).

Eccoptocarpa obconiciventrif Launert
Status: LR-lc
Distribution: North
Type is from Kasama. In open places. Altitude 1,000–1,500 m. Distribution extends into Zambia from Tanzania. Monotypic genus. Found over a wide area. Is an annual grass.

Eragrostis anacrantha Cope
Status: LR-lc
Endemism: Endemic
Distribution: Central, North
Found growing in dambos, in seasonally wet woodlands beside rivers.

Eragrostis anacranthoides Cope
Status: LR-lc
Endemism: Endemic
Distribution: Central, North

Common on rocks beside running water. Altitude of about 1,600 m.

Eragrostis dentifera Launert
Status: LR-nt
Endemism: Endemic
Distribution: North
Altitude of about 1,700 m in seasonally wet grassland.

Eragrostis divaricata Cope
Status: LR-lc
Distribution: West
Found in lateric ponds on peaty soils and damp holes. Altitude of 1,400 m. Also recorded in DRC.

Eragrostis fimbrilata Cope
Status: LR-lc
Endemism: Endemic
Distribution: Central, West
The type is from Kitwe by Fonshowe. Found in dombo margins in high rainfall areas. It has possibly been overlooked.

Eragrostis lepidobasis Cope
Status: LR-nt
Endemism: Endemic
Distribution: West
Found in wet areas and watershed areas. Known only from the type collection. Must have been overlooked by collectors.

Eragrostis mariae Launert
Status: LR-nt
Endemism: Endemic
Distribution: North
Found in dambos in swampy grassland usually in peaty soil at altitudes of 1,700 m. Type is from Lake Chilo.

Eragrostis milnei Launert ex Cope
Status: LR-nt
Endemism: Endemic?
Distribution: West
Found in dambos and standing water in lateric ponds. Type is from Kolendo Dambo in Mwinilungo. Known only from two collections. So far known only from this locality, but may also occur in DRC and Angola.

Eragrostis oligostachya Launert ex Cope
Status: LR-nt
Distribution: West
Found in dambos in damp grassland, in laterite and margins in shallow pools near rocky outcrops.

Eragrostis spicigera Cope
Status: LR-nt
Endemism: Endemic
Distribution: North
Watershed grassland in sandy soil at an altitude of 1,400–1,450 m. Known only from the type locality where it was collected four times by Astle.

Hydrothauma manicatum Hubb.
Status: LR-lc
Distribution: North, West
An aquatic grass, it grows in shallow pools and in stream outcrops.

Hyparrhenia anemopaegma Clayton
Status: LR-lc
Endemism: Endemic
Distribution: Central/East
It has a limited national distribution.

Lophachme parva Renvoize & Clayton
Status: LR-lc
Endemism: Endemic
Distribution: North, Central
Dambos and damp places beside rivers. Altitude of 1,400–1,700 m. Type from Shiwa Ngandu.

Panicum bullockii Renvoize
Status: LR-lc
Endemism: Endemic?
Distribution: North

Woodland on mountain slopes, on oreaceous soils. Altitude of 1,750–2,000 m. Type from Chishimba Falls in Kosoma District. Probably a number of collections. Not known whether it is endemic to Zambia.

Panicum pseudoracemosum Renvoize
Status: LR-lc
Endemism: Endemic?
Distribution: West, North
Damp places in shade. Altitude of 1,350–1,650 m. Type from Mwinilungo near the Koombo River. Widespread distribution. Not known whether it is endemic to Zambia.

Pogonarthria refracta Launert
Status: LR-lc
Endemism: Endemic
Distribution: South, North
Kalahari sands, in woodland on disturbed ground. Altitude of 1,000 m. Type from Nomwolo (collected in 1962).

Setaria pseudaristata (Peter) Pilg.
Status: LR-nt
Widespread. Also found in East Africa and further afield.

POLYGALACEAE

Polygala friesii Chodat
Status: LR-lc
Endemism: Endemic?
Distribution: North, West
Habitat in swamps and peat bogs and marshy grassland. Altitude of 1,700–1,750 m. Type from near Monso. Widespread. Not known whether it is endemic to Zambia.

PORTULACACEAE

Portulaca foliosa Ker Gawl.
Status: LR-nt

PSILOTACEAE

Psilotum nudum (L.) P.Beauv.
Status: LR-lc
Riverine or wet miombo species. A cosmopolitan species, but seldom common anywhere. The species is rare but extremely widespread in Zambia. Its habitat is not threatened.

ROSACEAE

Prunus africana (Hook.f.) Kalkm.
Status: LR-nt
Widespread but uncommon habitat. Also in Angola, Burundi, Cameroon, DRC, Equatorial Guinea (Biaka), Ethiopia, Kenya, Madagascar, Mozambique, Rwanda, São Tomé & Príncipe and South Africa (Eastern Cape, Gauteng, KwaZulu-Natal, Mpumalanga, Limpopo Province).

RUBIACEAE

Batopedina linearifolia (Bremek.) Verdc.
Status: LR-lc
Endemism: Endemic
Distribution: Central, West
Crevices on granite hills at 1,250 m. Habitat is not threatened. Plant is 10–25 cm tall.

Fadogia tomentosa De Wild. var. **calvescens** (Verdc.) Verdc.
Status: LR-lc
Endemism: Near-endemic
Distribution: Barotseland, West
Brachystegia–Cryptosepalum woodland and Kolohori

sand. Type from Machili in Western Province. Probably not common.

Fadogia triphylla Baker var. gracilifolia Verdc.

Status: LR-lc

Distribution: North

Grows in degraded habitat of Manates, Brachystegia and Uapaca woodland. Also old cultivations, i.e. in degraded miamba. Type from southwestern Tanzania.

Otiophora angustifolia Verdc.

Status: LR-lc

Endemism: Endemic?

Distribution: North

On rocky outcrops. Fairly widespread. Distance between the two known localities is about 400 km. Possibly uniformly distributed between these localities. Dwarf shrub/woody herb.

Sericanthe andongensis (Hiern) Robbrecht var. andongensis

Status: LR-nt

In riverine forest. Widespread. Occurs further north through Tropical Africa.

Tapiphyllum cinerascens (Hiern) Robyns var. laetum (Robyns) Verdc.

Status: LR-lc

Endemism: Endemic

Distribution: East, North

Brachystegia woodland in rocky places. Altitude of 900–1,350 m. Widespread.

Tapiphyllum cinerascens (Hiern) Robyns var. richardsii (Robyns) Verdc.

Status: LR-lc

Distribution: North

Grassland, Cambretum–Grewia thicket and Brachystegia woodland. Sandy soil sometimes in rocky places. Altitude of 1,200–1,500 m.

Tapiphyllum molle Robyns

Status: LR-lc

Distribution: Barotseland, North, West

Julbernardia and Brachystegia woodland on Kalahari sand. Type from Angola. Several localities known from northwestern Zambia have been provisionally included in this taxon pending a full taxonomic investigation. Widespread. Not utilised.

Tapiphyllum rhodesiacum (Tennant) Bridson

Status: LR-lc

Endemism: Endemic

Distribution: Central, North

Habitat is escarpment vegetation, thicket and woodland on granite rocks and very stony ground. Often on rocky hills in Brachystegia woodland. Type from Serenje District by Fanshawe. A shrub to a small tree.

RUTACEAE

Vepris mendoncana W.Mziray

Status: LR-lc

Endemism: Endemic

Distribution: North

Found in riverine forests.

SAPINDACEAE

Blighia unijugata Baker

Status: LR-nt

Distribution: North

Not common in Zambia.

Deinbollia fanshawei Exell

Status: LR-lc

Endemism: Endemic

Distribution: Barotseland, West

Known only from Barotseland in Kalahari sand woodland.

Eriocoelum lawtonii Exell

Status: LR-lc

Endemism: Endemic

Distribution: North, West

Habitat is riverine forest, which is not particularly threatened. The type is from Kasama District, Kawambwa. Fairly widespread.

SCROPHULARIACEAE

Alectra glandulosa Philcox

Status: LR-lc

Endemism: Endemic

Distribution: North, South

In moist grassland from 1,500–1,830 m. Type is from 32 km from Mwinilunga on the road to Salwezi at Mundwizi Oamba, altitude 1,700 m.

Alectra pubescens Philcox

Status: LR-lc

Endemism: Endemic

Distribution: North

Type from Mbala on Chilangawela Escarpment at 1,500 m.

Buchnera laxiflora Philcox

Status: LR-lc

Endemism: Endemic

Distribution: West, North

Grows in dambas at altitudes up to 1,200–1,400 m.

Buchnera trilobata Skan

Status: LR-lc

Distribution: West, North

Grows in mantane grassland and Brachystegia woodland up to altitudes of 2,500 m. Species is scattered over a wide area in Zambia. Seeds are small and mobile. Also recorded from Malawi.

Crepidiorhopalon bifolius (Skan) Fischer

Status: LR-lc

Endemism: Endemic?

Distribution: North, West

Wet areas up to an altitude of 1,500 m. Type is from Kambale. Widespread. Known only from Flara zambeziaca area and is possibly a Zambian endemic. Often collected. Habitat is common.

STRYCHNACEAE

Strychnos xantha Leeuwenb.

Status: LR-lc

Endemism: Endemic?

Distribution: North, West

In gallery forests or riverine thickets. Possibly a Zambian endemic but needs verification.

TILIACEAE

Corchorus saxatilis Wild

Status: LR-lc

Endemism: Endemic?

Distribution: South, West, Central

Widespread on shallow soil and rocky outcrops.

Triumfetta tenuipedunculata Wild

Status: LR-lc

Endemism: Endemic

Distribution: North, West

Oomp shady woodland. Type is from Mbala District. Widespread. Small herb.

TURNERACEAE

Stapfiella zambeziensis R.Fern. forma grandifolia R.Fern.

Status: LR-lc

Endemism: Endemic

Distribution: North

Margins of mushitu near streams, which is not a particularly endangered habitat. This taxon (Stapfiella zambeziensis forma grandifolia) has larger leaves than the other (Stapfiella zambeziensis forma zambeziensis). Taxonomy needs to be resolved.

Stapfiella zambeziensis R.Fern. forma zambeziensis

Status: LR-lc

Endemism: Endemic

Distribution: North

Margins of mushitu near streams, which is not a particularly endangered habitat. Type is from 8 km east of Kasama by Rabinsan.

VELLOZIACEAE

Xerophyta villosa (Baker) Smith & Ayensu

Status: LR-nt

Fairly common.

VITACEAE

Cissus fanshawii Wild & R.B.Drumm.

Status: LR-lc

Endemism: Endemic

Distribution: North, West

Grows on termite mounds in Brachystegia woodland.

Cyphostemma richardsiae Wild & R.B.Drumm.

Status: LR-lc

Endemism: Endemic?

Distribution: North, West

Found in Brachystegia woodland.

Cyphostemma saxicolum (Gilg & R.E.Fr.) Descouings ex Wild & R.B.Drumm.

Status: LR-lc

Endemism: Endemic

Distribution: North

Grows in dense riverine forest and in dense, dry woodland. Five collections from Mbala.



Satyrium sceptrum, probably used as **chikanda**. (Photo: G. Williamson)

DATA DEFICIENT

ACANTHACEAE

Duosperma cuprinum Brummitt
Status: DD
Endemism: Endemic?
Source: IUCN TPC (1981)

Duosperma fanshawei Brummitt
Status: DD
Endemism: Endemic?
Source: IUCN TPC (1981)

Duosperma fimbriatum Brummitt
Status: DD
Endemism: Endemic?
Source: IUCN TPC (1981)

Justicia salviaoides Milne-Redh.
Status: DD
Distribution: North
Itigi thicket endemic. Leafless shrub. Also known from Tanzania.

AMARANTHACEAE

Celasia chenapadiifolia Baker
Status: DD
Distribution: West
In Angola it grows in abandoned cultivated fields in damp soils. In Zambia, it is known from a few specimens collected along a roadside. This is quite likely a weed but this information is unavailable.

AMARYLLIDACEAE

Crinum subcernuum Baker
Status: DD
Distribution: Central, South

ANACARDIACEAE

Lannea gassweileri Exell & Mendença subsp. **tamentella** (R. & A.Fern.) Gillett
Status: DD
Endemism: Endemic?
Distribution: North
Woodlands of several types on sandy plains. Type from Shiwa Ngandu. The species is used for rope-making. Unable to confirm whether it is endemic.

Lannea schimperi (Hochst. ex A.Rich.) Engl.
Status: DD
Endemism: Endemic?
Distribution: Central, South, West
The taxonomy of this species probably needs attention. It has a smooth white bark.

Ozorea bredoi R. & A.Fern.
Status: DD
Endemism: Endemic
Distribution: North
Known only from the type.

Ozorea viridis R. & A.Fern.
Status: DD
Endemism: Endemic?
Distribution: Central
Type from Mkushi Bama.

Rhus achracea Meikle var. **saxicala** R. & A. Fern.
Status: DD
Endemism: Endemic?
Distribution: North
Type is from the Muchinga Escarpment. Known only from the type collection, although Angus's specimen is doubtful.

Sorindeia undulata R. & A.Fern.
Status: DD
Endemism: Endemic
Distribution: North
In riverine forest. Type collected by Fanshawe.

APONOGETONACEAE

Apanogeton stuhlmannii Engl.
Status: DD
Source: IUCN TPC (1981).

ARECACEAE

Hyphaena petersiana Klatzsch
Status: DD
Distribution: North, East, Central
Sparsely scattered palm tree, in patches. Recovery rate very low.

ASCLEPIADACEAE

Ceropegia cataphyllaris Bull.
Status: DD
The taxonomy may need checking.

ASPHODELACEAE

Alaë bicomitum L.C.Leach
Status: DD
Endemism: Near-endemic?
Distribution: North
Collected by Richards in Mbala (near Kalamba River) but problem with collection numbering. Leach subsequently cultivated it. Reported to have been recently seen on an island in northern Zambia at the Tanzanian border. Currently known only from a small area in the vicinity of the type locality.

Aloe enatata L.C.Leach
Status: DD
Endemism: Endemic

Alaë luapulana L.C.Leach
Status: DD
Endemism: Near-endemic?
Distribution: North
Collected along the DRC border. Currently known only from the type, but this needs confirmation.

Aloe milne-redheadii Christian
Status: DD
Endemism: Endemic?
Distribution: West
Type from Mwinilunga. Reported to be common in miamba woodland at the type locality. Possibly also in Angola and DRC but this cannot be confirmed; apparently known only from the type.

Alaë veseyi Reynolds
Status: DD
Endemism: Endemic?
Distribution: North
Type from near Kalamba Falls collected by Richards. Possibly also in Tanzania but this cannot be confirmed.

ASPLENIACEAE

Asplenium chaseanum Schelpe
Status: DD
Distribution: North
On rocks in forest in deep shade. Type from Mansa

District by White. Also recorded in DRC. Initially suggested that it should be removed from the RDL.

ASTERACEAE

Bidens oligoflora (Klatt) Wild
Status: DD
Taxonomy needs attention.

Erythracephalum dictyophlebium Wild
Status: DD
Endemism: Endemic
Distribution: North
Found in grassland. Known only from the type collection. Not really a well-collected area.

Lophalaena alata Duvign.
Status: DD
Endemism: Endemic?
Distribution: Central, West
Small pyrophyte with woody rootstock. Found in plateau woodland. Collected by Fanshawe in Luanshya (1954) and Mpangwe (1957).

Pleiotaxis angustirugosa Jeffrey
Status: DD
Endemism: Endemic
Distribution: Barotseland
Type is from Chavuma. Endemic to Barotseland.

Rastraphyllum pinnatipartitum Wild & G.V.Pape
Status: DD
Endemism: Endemic
Distribution: West
In seasonally damp grassland. Monotypic genus. Type from Ikelenje in Mwinilunga (collected in 1965). Known only from the type collection.

Vernania heladea Wild
Status: DD
Endemism: Endemic?
Distribution: North
Swampy grassland. Type from the Layi Flats in Mbala (1965). Apparently known only from the type.

Vernania lycioides Wild
Status: DD
Endemism: Endemic
Distribution: West
Woodland. Type from 32 km south of Mwinilunga on the road to Kabampa. Known only from the type. A sub-shrub.

Vernania madefacta Wild
Status: DD
Endemism: Endemic
Distribution: North
Habitat is damp rocks by waterfalls. Type from Chilangawela in Mbala District. Known only from the type.

BALSAMINACEAE

Impatiens hydrogetanoides Launert
Status: DD
Endemism: Endemic
Distribution: North
Habitat in waterfall spray in dense shade, in a ravine in evergreen forest. Flower colour pink. Zambia-Mafinga is not well-collected.

BEGONIACEAE

Begonia pygmaea Imscher
Status: DD
Endemism: Endemic

Distribution: North
In riverine forest, altitude of 910 m. Type from Lunzuo near Mbolo, by Richards (1955). Known only from the type.

BORAGINACEAE

Cystostemon loveridgei Martins

Status: DD
Endemism: Endemic
Distribution: West

Cystostemon mwinilungensis Martins

Status: DD
Endemism: Endemic
Distribution: West
Grows in degraded Cryptosepalum and Copaifera forests, savanna woodland on Kolohori sands.

BRASSICACEAE

Coronopus zombiensis Jonsell

Status: DD
Source: IUCN TPC (1981).

CAMPANULACEAE

Wohlenbergia cephalodino Thulin

Status: DD
Endemism: Endemic
Distribution: West
Habitat is woodland on Kolohori sand. Type is from Kobompo. Unclear whether it is known only from the type. Check taxonomy.

COMBRETACEAE

Combretum podoides Engl. & Diels

Status: DD
Endemism: Endemic?
Distribution: North, East, South

COMMELINACEAE

Aneilema richardsiae Brenan

Status: DD
Endemism: Endemic
Source: IUCN TPC (1981).

Commelino grondis Brenan

Status: DD
Source: IUCN TPC (1981)

Commelina pycnospathe Brenan

Status: DD
Endemism: Endemic?
Distribution: Central
Deciduous forest on steep gorge slopes.

CONVOLVULACEAE

Ipomoea milnei Verdc.

Status: DD
Distribution: North
On sandy and rocky hills. Altitude of 1,320–1,341 m. Type from Angola.

Ipomoea proteo Britten & Rendle

Status: DD
Distribution: North
Sandy soils on roadsides, altitude 1,650 m. Type from Angola.

Merremia stelloto Rendle

Status: DD
Distribution: West
In woodland. Type from Angola.

CUCURBITACEAE

Trochomeria subglabro Jeffrey

Status: DD
Endemism: Endemic
Distribution: West, North
Ecology and habitats are unknown. Type from Motonchi Form by Milne-Redhead. Widespread.

CYPERACEAE

Actinoschoenus repens J.Raynal

Status: DD
Endemism: Endemic
Distribution: West
Known mainly from the collections of Milne-Redhead.

Alinula malawica (J.Raynal) Goetgh. & Vorster

Status: DD
Distribution: North
Also known from Malawi.

Ascolepis ampullacea J.Raynal

Status: DD
Endemism: Endemic
Distribution: North
Only known from type.

Ascolepis majestuosus Duvign. & Léonard

Status: DD
Distribution: North, Barotseland

Ascolepis proteo Welw. subsp. *otropurpureo* Lye

Status: DD
Endemism: Near-endemic?
Distribution: North
Possibly occurs in southern Tanzania.

Ascolepis proteo Welw. subsp. *chrysocephalo* Lye

Status: DD
Endemism: Near-endemic?
Records for it from southern Tanzania but reported (unconfirmed) to occur in northern Zambia at the Tanzanian border.

Ascolepis pseudopeteri Goetgh.

Status: DD
Endemism: Near-endemic?
Distribution: West
Possibly occurs in southern Tanzania.

Ascolepis pusilla Ridley var. *echinata* Hooper

Status: DD
Endemism: Near-endemic
Distribution: West
Occurs in Tanzania.

Ascolepis trigono Goetgh.

Status: DD
Distribution: North

Bulbostylis micromucronata Goetgh.

Status: DD
No herbarium material from Zambia in Kew.

Corex robinsonii Podl.

Status: DD
Endemism: Endemic
Distribution: East
No material in Kew, just a description.

Cyperus oltochrysocephalus Lye

Status: DD
Endemism: Endemic
Distribution: West
Source: IUCN TPC (1981). No herbarium material at Kew.

Cyperus kosomensis Podl.

Status: DD
Endemism: Endemic
Distribution: North

Source: IUCN TPC (1981). No herbarium material at Kew.

Cyperus mwinilungensis Podl. var. *maior* Podl.

Status: DD
Endemism: Endemic
Distribution: North
Source: IUCN TPC (1981).

Cyperus robinsonii Podl.

Status: DD
Endemism: Endemic
Distribution: South
Source: IUCN TPC (1981).

Cyperus zambesiensis C.B.Cl.

Status: DD
Apparent taxonomic confusion with *Cyperus glaucophyllus* var. *zambesiensis*.

Lipocorpo echinus J.Raynal

Status: DD
Endemism: Endemic
Distribution: North
Source: IUCN TPC (1981).

Lipocorpo robinsonii J.Raynal

Status: DD
Endemism: Near-endemic
Distribution: North, West, South, Barotseland
Also known from Angola.

Pycurus otrorubidus Nelmes

Status: DD
Endemism: Endemic
Distribution: West

Pycurus heterochrous Nelmes

Status: DD
Endemism: Endemic
Distribution: West

Pycurus micromelos Lye

Status: DD
Endemism: Endemic?
Distribution: North
Possibly occurs in southern Tanzania.

Pycurus poikilostachys Nelmes

Status: DD
Endemism: Endemic
Distribution: West

Schoenoplectus rhodesicus (Podl.) Lye

Status: DD
Endemism: Near-endemic
Distribution: North
Also known from Tanzania.

Scleria coleicolo Robinson

Status: DD
Endemism: Near-endemic?
Distribution: West
Possibly occurs in southern Tanzania.

Scleria chlorocalyx Robinson

Status: DD
Endemism: Endemic
Distribution: North, West
Source: IUCN TPC (1981).

Scleria delicatula Nelmes

Status: DD
Endemism: Near-endemic
Distribution: West, North
Possibly occurs in southern Tanzania.

Scleria fulvipilosa Robinson

Status: DD
Endemism: Endemic?
Distribution: North
Possibly occurs in southern Tanzania.

Scleria lucentinigricans Robinson
Status: DD
Endemism: Endemic
Distribution: North
Source: IUCN TPC (1981).

Scleria patula Robinson
Status: DD
Endemism: Endemic
Distribution: West
Source: IUCN TPC (1981).

Scleria palyrrhiza Robinson
Status: DD
Endemism: Endemic
Distribution: North, West
Source: IUCN TPC (1981).

Scleria procumbens Robinson
Status: DD
Endemism: Endemic?
Distribution: North
Possibly occurs in southern Tanzania.

Scleria xeraphila Robinson
Status: DD
Endemism: Endemic
Distribution: West
Source: IUCN TPC (1981).

Scleria zambesica Robinson
Status: DD
Endemism: Endemic
Distribution: West
Source: IUCN TPC (1981).

Volkiella disticha Merxm. & Czech.
Status: DD
Apparently no Zambian specimens at Kew. Expected to occur in Zambia, Zimbabwe and Namibia.

DICHAPETALACEAE

Dichapetalum whitei Torre
Status: DD
Endemism: Endemic
Distribution: West
Habitot is deciduous Sarcocephalus and Albizia woodland.

EBENACEAE

Diospyras mwaensis F.White
Status: DD
Endemism: Near-endemic?
Distribution: North
Found in miombo woodland and Itigi thicket. Associated with termite mounds (oltilude 800–1,500 m). Also recorded from DRC.

EUPHORBIACEAE

Acalypha dikuluwensis Duvign. & Dewit.
Status: DD
Endemism: Near-endemic?

Croton gossweileri Hutch.
Status: DD
Distribution: West
Single collection from Zambia. Riverine forest. Also from Angola.

Euphorbia cooperi N.E.Br. ex Berger var. **calidicola** L.C.Leach
Status: DD
Endemism: Endemic
Distribution: East, Central/East, South
Widespread. Associated with rocky habitots.

Euphorbia cooperi N.E.Br. ex Berger var. **ussanguensis** (N.E.Br.) L.C.Leach

Status: DD
Endemism: Endemic
Distribution: Central, North
Locally common.

Euphorbia decidua Bally & L.C.Leach
Status: DD
Endemism: Endemic
Locally common.

Euphorbia fartissima L.C.Leach
Status: DD
Endemism: Near-endemic?
Distribution: Central, South
Mid-Zombezi Volley. Volley thickets and basolt gorges.

Euphorbia griseala Pax subsp. **zambiensis** L.C.Leach
Status: DD
Endemism: Endemic?
Distribution: Central
Type from Kopiri Mposhi.

Euphorbia inundaticala L.C.Leach
Status: DD
Endemism: Endemic
Distribution: East

Euphorbia jubata L.C.Leach
Status: DD
Endemism: Endemic?
Distribution: Central
Locally common. Associated with rocky habitots.

Euphorbia luapulana L.C.Leach
Status: DD
Endemism: Endemic?
Distribution: North

Euphorbia mwinilungensis L.C.Leach
Status: DD
Endemism: Endemic?
Distribution: West
Locally common.

Euphorbia papillascapsa L.C.Leach
Status: DD
Endemism: Endemic?
Distribution: North
Type from Chipili. Miombo woodland.

Euphorbia perplexa L.C.Leach var. **perplexa**
Status: DD
Endemism: Endemic?
Distribution: North
Locally common.

Euphorbia platyrrhiza L.C.Leach
Status: DD
Endemism: Endemic?
Distribution: West
Grass pon on Kolohori sonds. Locally common.

Eupharbia sereti De Wild. subsp. **variantissima** L.C.Leach
Status: DD
Endemism: Endemic?
Distribution: West
Type from Kobompo Gorge. On rock.

Euphorbia whellanii L.C.Leach
Status: DD
Endemism: Endemic
Distribution: North
Known only from type locality.

Euphorbia williamsonii L.C.Leach
Status: DD
Endemism: Endemic?
Distribution: North
Forms fibrous mots on rocky quortz.

Jatropha pachyrrhiza Radcl.-Sm.
Status: DD

Endemism: Endemic
Distribution: Central, South
Perenniol herb. Widespread, but known from few specimens. Kolohori sond miombo.

Manadenium fanshawei Bally
Status: DD
Distribution: North, West
Also known from Tanzania.

Phyllanthus friesii Hutch.
Status: DD
Endemism: Endemic
Distribution: North
Known only from the type specimen. Collected by Fries in 1914.

Phyllanthus martinii Radcl.-Sm.
Status: DD
Endemism: Endemic
Distribution: West
Type from Zambia. Baikiaea thicket (mutemwo), especially on old drainoge lines.

Phyllanthus pseudacarunculus Radcl.-Sm.
Status: DD
Endemism: Endemic?
Distribution: North
Known from three specimens from one locality. Not known whether it is endemic to Zambia.

Phyllanthus sananei J.F.Brunel
Status: DD
Endemism: Endemic
Distribution: North
Known only from the type locality. Taxonomic confusion as this has been reportedly sunk under Phyllanthus pseudoniruri which is found in Zambia, Zimbabwe and Molowi. P. sananei is known from the specimen Sonone 877 (1969).

Phyllanthus tener Radcl.-Sm.
Status: DD
Endemism: Endemic?
Distribution: South
Type from Chirundu. Not known whether it is endemic to Zambia.

Phyllanthus xiphepharus J.F.Brunel ex Radcl.-Sm.
Status: DD
Endemism: Endemic
Distribution: North
Type from Mbolo District.

Sapium acetasella Milne-Redh. var. **lineare** Léonard
Status: DD
Endemism: Endemic
Distribution: North
Type from Kowombwo. In sondy dombos.

FABACEAE

Aeschynomene bracteosa Baker var. **major** Verdc.
Status: DD
Endemism: Endemic
Distribution: North
Known only from the type locality in Kowombwo, collected by Fanshowe (1950s). Areo is poorly collected and as o result the species may be more abundant than whot is currently known. Occurs in bushlund.

Brachystegia astlei Hoyle
Status: DD
Endemism: Endemic
Distribution: North
Only been collected once in o dombo in Kowombwo by Brummitt. Not o conspicuas tree and may have been overlooked. Known only from the type and one other collection.

Brachystegia michelmoresi Hoyle
Status: DD

Endemism: Endemic
Distribution: North
Originally thought to be the same species as B. astelei, but B. michelmarei has bigger leaflets. Known only from the type and one other collection.

***Crotalaria nudiflora* Polhill**

Status: DD
Endemism: Endemic
Distribution: North, West
The type is from the Luombo River (Kasamo District). Also collected in Kawambwa at several localities. Disturbed grassy places near rivers.

***Crotalaria palytricha* Palhill**

Status: DD
Endemism: Near-endemic?
Distribution: West
Evergreen thicket. Also known from DRC.

***Crotalaria tristis* Palhill**

Status: DD
Endemism: Endemic
Distribution: North
Collected at Mbala twice. This species could be a pioneer species. Secondary miamba (miamba that was under cultivation/disturbed/cut and is recovering).

***Crotalaria vanmeelii* Wilczek**

Status: DD
Endemism: Endemic
Distribution: North
The species grows in open, disturbed places on sandy soils.

***Cryptosepalum exfoliatum* De Wild. subsp.**

***craspedoneuron* Duvign. & Brenan**
Status: DD
Distribution: North
Wide distribution. Sand and rocky outcrops.

***Cryptosepalum exfoliatum* De Wild. subsp.**

***puberulum* Duvign. & Brenan**
Status: DD
Source: IUCN TPC (1981).

***Dalbergia acutifoliolata* Mend.**

Status: DD
Source: IUCN TPC (1981)

***Desmadium fulvescens* Schubert**

Status: DD
Endemism: Near-endemic?
Distribution: West
Moist dambas at an altitude of 1,200 m. Recorded from DRC.

***Dalichos filifoliolus* Verdc.**

Status: DD
Source: IUCN TPC (1981)

***Dalichas magnificus* Verdc.**

Status: DD
Source: IUCN TPC (1981)

***Entada bacillaris* F.White var. *plurijuga* Brenan**

Status: DD
Endemism: Endemic
Distribution: North
A shrub up to 2 m tall with small leaves. Found in sandy soil.

***Entada dalicharachis* Brenan**

Status: DD
Endemism: Endemic
Distribution: North
Very conspicuous and unusual plant, should have been collected more frequently. Collected in Kawambwa by Fanshawe and in Mbala (Lufuba) by Richards. Brachystegia woodland, sandy soils, open riverine situations. Altitude of 780–1,620 m.

***Humularia submarginalis* Verdc.**

Status: DD

Endemism: Endemic
Distribution: North
Type from Manso. Not a particularly well-collected area. Marquesia and Brachystegia woodland, wet woodlands.

***Indigofera deightanii* Gillett subsp. *rhodesica* Gillett**

Status: DD
Source: IUCN TPC (1981).

***Indigofera spathulata* Gillett**

Status: DD
Source: IUCN TPC (1981)

***Katschya imbricata* Verdc.**

Status: DD
Endemism: Endemic
Distribution: West
Collected only once (1969) in Solwezi. This locality is not well-collected. Isengo woodland.

***Millettia eetveldeana* (Micheli) Hauman**

Status: DD
Found on hoemotite habitats. Possibly more widespread than is currently known.

***Ophrestia unicastata* (Hermann) Verdc.**

Status: DD
Source: IUCN TPC (1981).

***Tephrosia muenzneri* Harms subsp. *pedalis* Brummitt**

Status: DD
Endemism: Endemic
Distribution: East
Habitat is pink, sandy loam in Brachystegia woodland. Type locality is Lundazi.

***Tephrosia rabinsoniana* Brummitt**

Status: DD
Endemism: Endemic?
On rocky hillsides, at altitudes of 1,340 m. Type collected from Mfuwila (ungazetteered). Possibly known only from the type.

***Tephrosia zambiana* Brummitt**

Status: DD
Endemism: Endemic
Distribution: North
Type from Mungwi. Area has not been well-collected.

FLACOURTIACEAE

***Scalapia stolzii* Gilg & Sleumer**

Status: DD
Habitat is riverine forest.

GENTIANACEAE

***Faraa allata* Taylor**

Status: DD
Endemism: Endemic?
This is the only specimen that is cited in Flora zambesiaca. Collected on a rocky ledge at an altitude of about 1,000 m.

***Faraa minutiflora* P.Taylor**

Status: DD
Endemism: Endemic
Distribution: North
Grows in damp sand amongst rocks. Found at an altitude of 1,260 m.

***Sebaea africana* Paiva & Nogueira**

Status: DD
Endemism: Endemic
Distribution: North
In damp sandy ground amongst grass at altitude of 1,680 m. Type from the Kawambwa-Mbereshi Road by Richards (1957).

***Sebaea alata* Paiva & Nogueira**

Status: DD
Endemism: Endemic
Grows in dambas at altitudes of 1,580 m. Type from Shischingo Ranch (collected by Astle). Widespread but not very common.

***Sebaea caudata* Paiva & Nogueira**

Status: DD
Endemism: Endemic
Distribution: South
Type collected from Mpanaza Mission at Simasunda Damba, 1955. Possibly known only from the type.

***Sebaea clavata* Paiva & Nogueira**

Status: DD
Endemism: Endemic
Distribution: North
In Brachystegia woodland and in taller robust vegetation. Type on Senga Hill road to Mparakasa (Mbala). Possibly known only from the type.

***Sebaea fernandesiana* Paiva & Nogueira**

Status: DD
Endemism: Endemic
Distribution: West
On damp soil on rocky outcrops at an altitude of 1,350 m. Type is from Kaleni Hill (6 km north of Kaleni Hill on the Zombezi Rapids). Possibly known only from the type.

HYDROPHYLLACEAE

***Hydrolea brevistyla* Verdc.**

Status: DD
Endemism: Endemic?
Distribution: North
At edges of dambos beginning to dry out and also horizontal slabs of sandstone. Easily irrigated by river overflows. Altitude of 1,350 m. Very wide area. Deep blue, conspicuous corolla; plant up to 30 cm tall. Unable to confirm whether it is endemic to Zambia.

HYPOXIDACEAE

***Hypoxis cuanzensis* Welw. ex Baker**

Status: DD
Endemism: Endemic?
Distribution: North
Found in a well-collected area. Unable to confirm whether it is endemic to Zambia.

***Hypaxis filiformis* Baker**

Status: DD
Distribution: Central
Area has been relatively well-collected.

***Hypaxis rigidula* Baker**

Status: DD
Distribution: North

ILLECEBRACEAE

***Corrigiola paniculata* Peter**

Status: DD

IRIDACEAE

***Dierama longistylum* Marais**

Status: DD
Distribution: East
Found in montane grassland at 600–2,400 m altitude.

***Lapeirousia zambeziaca* Goldblatt**

Status: DD
Distribution: West
Habitat is boggy grassland (probably seasonally inundated). Type from western Angola. Appears to be endemic to the upper Zambezi.

ISOETACEAE

Isoetes aequinoctialis Welw. ex A.Br.
Status: DD

Not sure of its status elsewhere, probably not threatened. Widespread. Type from Nigero.

LAMIACEAE

Plectranthastrum cylindricalyx Mathew
Status: DD

Source: IUCN TPC (1981).

LAURACEAE

Beilschmiedia gilbertii Robyns & Wilczek var.
glabra Robyns & Wilczek

Status: DD
Endemism: Near-endemic?

Distribution: NorthWest
Type is from DRC.

LENTIBULARIACEAE

Gentlisea glandulosissima R.E.Fr.

Status: DD
Endemism: Endemic
Distribution: North

Found in permanent wet peaty bogs. Known localities very for oport.

Gentlisea pallida Fromm-Trinta & P.Taylor

Status: DD
Distribution: West

Permanent wet peat bogs. Also recorded from Angola.

LYTHRACEAE

Nesaea purpurascens Fern.

Status: DD
Endemism: Endemic

In muddy places near doms. Known only from Zombio. Known only from the type collection.

Nesaea robinsoniana Fern.

Status: DD
Distribution: North

In muddy places. Type collected by Robinson 95 km east of Kosomo. Only known from Zombio.

Rotala cordipetala R.E.Fr.

Status: DD
Distribution: North

In water on sandy ground. Collected from Lake Bengweulu. Possibly also known from Tonzonio.

Rotala dinteri Koehne

Status: DD
Endemism: Endemic?

Distribution: West
Habitat in shallow waters of peaty soils in dombos. Type from Mwinilungo, Kolendo Plain (Milne-Redhead). Known only from the type collection.

Rotala gossweileri Koehne

Status: DD
Distribution: West
Found in damp places and shallow water in loteritic dombos. Type is by Eyles from Mfuliro on the Copperbelt. Common habitat. Plant is 3 cm high and easily overlooked. Plants float when area is flooded. Known only from the type collection.

Rotala juniperina Fern.

Status: DD
Endemism: Endemic
Distribution: South
Muddy bottoms of shallow irrigation channels. Type from Kobwula Mwano Dam (by Robinson).

Rotala myriophylloides Welw. ex Hiern

Status: DD
Endemism: Endemic
Distribution: North
Type from Lake Chilo in Mbolo by Nosh.

Rotala submersa Pohnert var. *angustipetala* Fern.

Status: DD
Endemism: Endemic
Distribution: North
Ecology known from the type variety. Type locality in Mbolo.

MALPIGHIACEAE

Triaspis lateriflora Oliv.

Status: DD
Distribution: North
Climber on small trees in bushes and forest margins. Type is from Angola. Probably widely distributed.

MELASTOMATACEAE

Cinnobrotrys acaulis (Cogn.) Gilg

Status: DD
Endemism: Endemic
Distribution: West
Found on damp mossy rocks in dense evergreen shade vegetation. Known only from the type locality.

Dichaetanthera rhodesiensis A. & R.Fern.

Status: DD
Distribution: North, West, Barotseland
Known from loteritic soils and rocky tops of hills. Wide distribution.

Dissotis caloneura Engl. var. *pilosa* A. & R.Fern.

Status: DD
Endemism: Endemic
Distribution: North
Found in exposed situations in quartzite and sandstone rocks. Type from Luanshe on the Copperbelt by Fonshowe. Shrub or small tree up to 3.5 m tall. The two known localities are for oport.

Dissotis debilis (Sond.) Triana var. *pedicellata* A. & R.Fern.

Status: DD
Endemism: Endemic?
Distribution: North
Type is from Mpulungu on Lake Tongonyiko in open marshy localities amongst grass. Unable to confirm whether it is endemic to Zombio.

Dissotis glandulosa A. & R.Fern.

Status: DD
Endemism: Endemic
Distribution: West
The type is from Mwinilungo by Robinson at the source of the Zombezi. It is possibly known only from the type.

MELIACEAE

Entandrophragma devevayi De Wild.

Status: DD
Distribution: Central, South
It is a dry evergreen thicket canopy species. Its habitat is threatened. Found in high and medium rainfall areas. Although of inferior quality, wood is used for furniture.

MENYANTHACEAE

Nymphoides milnei A.Raynal

Status: DD
Endemism: Endemic?
Distribution: West
Type is from Motonchi Farm collected in the 1930s. Found in a temporary pool. Small aquatic herb.

MORACEAE

Ficus ardisioides Warb.

Status: DD
Distribution: West

MYRSINACEAE

Anagallis rhodesica R.E.Fr.

Status: DD
Endemism: Endemic
Distribution: North
Apparently known only from the type which is from Koli between Monso and Bongweulu. In seasonally flooded places.

OLEACEAE

Chionanthus niloticus (Oliv.) Stearn

Status: DD
Distribution: North
It grows in riparian *mushitu* (moist evergreen forest, swamp forest). Its habitat is common and widespread.

ORCHIDACEAE

Angraecopsis gassneri G.Will.

Status: DD
Endemism: Endemic
Distribution: West
Known only from the type collection. Grows on trees and granite rocks in deep moss at 1,300 m. Probably overlooked, as it is a small plant.

Angraecum geniculatum G.Will.

Status: DD
Endemism: Endemic
Distribution: West
Species is epiphytic and grows in dense fringing forest. Only a single specimen citation is given in Flora zambesiaca. No locality is given. Probably overlooked, as it is a small plant.

Brachycorythis mixta Summerh.

Status: DD
Endemism: Near-endemic?
Distribution: West
Dombos and seasonally wet upland grassland. Type from Angola.

Disa caffra Bolus

Status: DD
Distribution: West
Occurs in wet grassland, usually in dombos at an altitude of 1,400–1,700 m. It is said to be rare in swampy areas in the Flora of southern Africa region.

Disa cryptantha Summerh.

Status: DD
Distribution: Central, West
Found growing in marshy grasslands or dombos. Altitude of 1,000–1,800 m. It is widespread although the species is rare.

Disa verdickii De Wild.

Status: DD
Distribution: West
Found in wet sandy grassland or in *Brachystegia* and *Uapaca* woodland and submontane grasslands. Could be widespread.

Disperis breviflora Verdc.

Status: DD
Endemism: Near-endemic
Distribution: Central, West
Habitat is *Brachystegia* woodland and open dombos usually in shallow soils over rocks. Altitude of 1,200–2,340 m. Probably not used as *chikondo*, as the tuber is 7 mm long. Possibly overlooked, as it is a small plant. Also known from Malawi.

Disperis katangensis Summerh. var. *minor* Verdc.
Status: DD
 Endemism: Endemic
 Distribution: West
 Found in Cryptosepalum woodland on sand. Altitude about 1,400 m. Probably overlooked.

Eulophia holubii Rolfe
Status: DD
 Distribution: Barotseland
 Well-represented outside Zambia.

Eulophia richardsiae P.J.Cribb & la Croix
Status: DD
 Endemism: Endemic
 Distribution: North
 Found in Brachystegia woodland at 1,500 m. The species apparently forms colonies where it grows. Probably overlooked, only appears when flowering, otherwise it is subterranean. Known only from the type, collected by Richards 10043 (1957).

Eulophia saxicola P.J.Cribb & G.Will.
Status: DD
 Distribution: Central
 Also recorded from Zimbabwe.

Habenaria macrotidion Summerh.
Status: DD
 Endemism: Endemic
 Distribution: North
 The type is Mbereshi which is poorly collected. Known from swampy ground. Probably used as chikanda.

Habenaria orthocentron P.J.Cribb
Status: DD
 Endemism: Endemic
 Distribution: North
 Very wet swamp forest. Probably used as chikanda.

Liparis molendinacea G.Will.
Status: DD
 Endemism: Endemic?
 Distribution: North
 Habitat is swamp forest in humus on the forest floor. Has pseudobulbs so probably not used. Swamp forests tend not to be collected. Not a densely populated area.

Nervilia kotschyi (Rchb.f.) Schltr. var. *purpurata* (Rchb.f. & Sond.) B.Pettersson
Status: DD
 Distribution: Barotseland
 Widespread in Africa. Not harvested.

Nervilia renschiana (Rchb.f.) Schltr.
Status: DD
 Distribution: South
 Brachystegia woodland and riverine forest fringes, often on termite mounds. Not harvested.

Platycoryne trilobata Summerh.
Status: DD
 Endemism: Endemic?
 Distribution: Central
 Type from Chokwenga headwaters. Known only from Lusoko. Not known whether it is endemic to Zambia.

Polystachya asper P.J.Cribb & Podzorski
Status: DD
 Endemism: Endemic?
 Distribution: West
 Evergreen fringing forest in dense shade. Known only from north of Mwinilungo. Narrow distribution. Possibly also in DRC.

Polystachya erythrocephala Summerh.
Status: DD
 Endemism: Endemic
 Distribution: West
 Collected on rocks in deep gorge near a river. The type is from Solwezi, collected by Milne-Redhead. Narrow endemic, probably overlooked as it is a small plant.

Polystachya mafingensis P.J.Cribb
Status: DD
 Endemism: Near-endemic
 Distribution: North
 Submontane mist zone woodland and grassland, often epiphytic on trees and shrubs. Altitude of 2,240 m. The species is known only from Malawi and Zambia, from the Mofingos. Probably overlooked as it is a small plant.

Polystachya moreauae P.J.Cribb & Podzorski
Status: DD
 Endemism: Endemic
 Distribution: North
 It is so far known only from the rivers of the Muchingo Escarpment. Narrow endemic.

Pteroglossaspis corymbosa G.Will.
Status: DD
 Endemism: Endemic
 Distribution: West
 Habitat is wet open grassland. Known only from the type locality.

Tridactyle translucens Summerh.
Status: DD
 Endemism: Endemic
 Distribution: West
 Habitat is epiphytic in Cryptosepalum and Brachystegia woodland. This species is known only from Mwinilungo, just east of the Kosompe River. Probably overlooked but a narrow endemic.

OXALIDACEAE

Oxalis abercornensis Knuth
Status: DD
 Distribution: North
 Only known from the type at the Zambia-Tanzania border. Collected in 1936. Along paths and as a garden weed. Possibly a form of *Oxalis oligotricha* (Richards collected this species about four times). Sounds like it is a familiar weed, but this needs confirmation.

PASSIFLORACEAE

Basananthe baumii (Harms) De Wilde var. *baumii*
Status: DD
 Endemism: Near-endemic?
 Distribution: North
 Habitat is dry secondary forest, woodland and scrub on dry sandy soils. Probably just overlooked and undercollected. Apparently known to occur in Angola.

PERIPLOCACEAE

Pentagonanthus grandiflorus (N.E.Br.) Bull. subsp. *grandiflorus*
Status: DD
 Source: IUCN TPC (1981).

POACEAE

Brachyachne simonii Kupicha & Cope
Status: DD
 Endemism: Endemic
 Distribution: West
 Found in laterite pans. Type is from Chizelo (Mfumbu District) at 1,130 m. Narrow distribution range.

Digitaria calcarata Clayton
Status: DD
 Endemism: Endemic?
 Distribution: North
 On shallow soil overlying rocks.

Digitaria minoriflora Goetgh.
Status: DD
 Endemism: Endemic

Distribution: North
 Found in grassland in sandy soil along roadsides.

Digitaria procurrens Goetgh.
Status: DD
 Endemism: Endemic
 Distribution: North
 Known only from the type collection. Found along the roadside in moteshe thicket (altitude of 1,200 m).

Digitaria sacculata Clayton
Status: DD
 Endemism: Endemic
 Distribution: North
 Known only from the type collection in damp sand.

Diheteropogon microterus Clayton
Status: DD
 Endemism: Endemic
 Distribution: North

Eragrostis astreptoclada Cope
Status: DD
 Endemism: Endemic?
 Distribution: North
 The habitat is damp sand or banks along river and sandy edges of peaty dombos. Altitude of 1,400–1,560 m.

Loxodera bovonei (Chiov.) Launert
Status: DD
 Source: IUCN TPC (1981).

Panicum perangustatum Renvoize
Status: DD
 Endemism: Endemic?
 Distribution: North
 Seasonally wet places. Type is from Misomfu. Not known whether it is endemic to Zambia.

Panicum phippisii Renvoize
Status: DD
 Endemism: Endemic?
 Distribution: North
 Dense scrub in shade. Altitude of 1,350 m. Type from Mporokoso. Not known whether it is endemic to Zambia.

PODOSTEMACEAE

Leiothylax drummondii C.Cusset
Status: DD
 Endemism: Endemic
 Distribution: Central
 Grows submerged in fast-flowing water, such as fast-flowing rivers associated with granite and in hydroelectric plant canals. Constitutes a problem where it is difficult to eradicate, possibly a problem plant. Type from Copiri-Monkoshi Road.

POLYGONACEAE

Oxygonum carnosum Grah.
Status: DD
 Source: IUCN TPC (1981).

Oxygonum litorale Grah.
Status: DD
 Source: IUCN TPC (1981).

PROTEACEAE

Protea poggei Engl. subsp. *mwinilungensis*
Status: DD
 Endemism: Endemic?
 Distribution: West
 One collection cited in Flora zambesiaca from Mwinilungo.

PTERIDACEAE

Ceratopteris cornuta (Beauv.) Le Prieur
Status: DD
Has a disjunct distribution and known from only a few localities in Zambia. Widespread in Tropical Africa to Senegal; also in Sudan, Madagascar, Socatro, Saudi Arabi and sa farth.

ROSACEAE

Hagenia abyssinica (Bruce) J.F.Gmel.
Status: DD
Distribution: East
Aframantane species. Fringing upland roinfarest, deciduous woodland and evergreen bushland. On Zambia-Nyika Plateau and possibly also from Mbala.

RUBIACEAE

Amphiasma redheadii Bremek.
Status: DD
Endemism: Endemic
Distribution: West
Type from Mwinilunga, by Milne-Redhead (1930) on the Warmibaba River (ungazetteered). Known only from the type. Found in Brachystegia woodland.

Fadogia luangwae Verdc.
Status: DD
Endemism: Endemic
Distribution: East
Hill miamba woodland (different to escorpmnt woodland, thin sails, edaphically interesting). Altitude 800 m. Habitat is widespread. Type is from North Luangwa National Pork. Known only from the type (P.P. Smith 0220).

Fadogia tomentosa De Wild. var. *flaviflora* (Rabyns) Verdc.
Status: DD
Distribution: Central, Baratseland, West
Brachystegia woodland on Kalahari sand. Tree af 1.5 m tall. Also recorded in Angala.

Geophila sp. Fanshawe 6855
Status: DD
Endemism: Endemic?
Distribution: West
Only a single specimen by Fanshawe from Ndala (1962). Found in dry evergreen forest at altitude of 1,370 m. Has yellow flowers. Similar to G. afzelii.

Hallea rubrostipulata (K.Schum.) Leroy
Status: DD
Locally called 'mupa' (Bemba name). Alternative genus name: Metragyna.

Oldenlandia corymbosa L.
Status: DD
Endemism: Endemic
Distribution: North
Sandy ground, oltitude 1,200 m. Originally called Oldenlandia linearis. Apparently known only from the type that was collected by Richords.

Oldenlandia rabinsonii Verdc.
Status: DD
Endemism: Endemic
Distribution: West
In lateritic gravel.

Pachystigma alboetulosum Verdc.
Status: DD
Endemism: Endemic
Distribution: North, Baratseland
Found in grassy plains near patches of waadlond. Type is from Kalamba.

Pachystigma micrapyren Verdc.
Status: DD

Distribution: West
Brachystegia waadland, sometimes an laterite outcraps. Unusual distribution. Also recarded in Angala.

Pavetta pygmaea Bremek.
Status: DD
Endemism: Endemic?
Distribution: West
Cryptosepalum waadland an sand. Altitude ± 1,000 m. Type is from Mwinilunga District, west of Dabeka Bridge. Not known whether it is endemic to Zambia.

Psychotria pumila Hiern var. *subumbellata* (Petit) Verdc.
Status: DD
Endemism: Endemic
Distribution: North
Riparian thicket. Type from Kawambwa District, collected by Fanshawe 3877 (1962). Known only from the type.

Rytigynia sp. Angus 604
Status: DD
Endemism: Endemic
Distribution: West
Species known only from a single collection, Angus 604 (1952). Mavunda an Kalahari sand. Mavunda is (Cryptosepalum) dry evergreen thicket ar forest which is a mosaic. The type is from Mwinilunga District.

Rytigynia sp. Fanshawe 2998
Status: DD
Distribution: West
Known only from a single collection, Fanshawe 2998 (1957). Collected on a granite boulder in evergreen thicket (mateshe thicket). One collection in Chingala.

Sarcacephalus pobeguini Pobéguin ex Pellegrin
Status: DD
Distribution: North, West
Habitat in gallery forest an well-drained sandy sail but probably periodically flooded. Distributed across the tap half of the country. Up to 22 m tall. Has capitulate inflorescences. Not known whether it is endemic ta Zambia.

Spermacoe princeae (K.Schum.) Verdc. var. *mwinilungae* Verdc.
Status: DD
Endemism: Endemic
Distribution: West
Found in riverine forest, altitude of 1,300 m. Collected ance on the West Lunga River by Brummitt, Chisumpa and Polhill (1975).

Spermacoe samfya Verdc.
Status: DD
Endemism: Endemic
Seasonally flooded flats. Type collected from Mukasa (ungazetteered) by Chabwela (1970).

Tapiphyllum cinerascens (Hiern) Robyns var. *cinerascens*
Status: DD
Endemism: Endemic?
Distribution: West
Cryptosepalum waadland, altitude af 1,350 m. Collected from Mwinilunga (1969). Apparently also known from Tanzania.

Tapiphyllum cistifalium (Welw.) Robyns var. *latifolia* Verdc.
Status: DD
Distribution: West
Uapaca waadland, altitude of 1,250 m. Type from Mwinilunga (1975). Is a suffrutex.

Vangueria volkensii K.Schum. var. *kyimbilensis* (Robyns) Verdc.
Status: DD
Distribution: East
In the mid-stratum of evergreen farests near streams. Type from Tanzoniá. Taxanamy may need attention.

RUTACEAE

Vepris fanshawei Mendançã
Status: DD
Endemism: Endemic
Distribution: North
Known only from the type taken from Chiengi, collected in 1958.

Vepris whitei Mendonça
Status: DD
Distribution: North
In evergreen riverine forest. Possibly in the Itigi thicket area. Type is from Mweru Wantipa. The fruits ore orange-yellow and sweet-tasting. Widespread.

SCROPHULARIACEAE

Buchnera arenicola R.E.Fr.
Status: DD
Endemism: Endemic
Distribution: North
Known only from the cited collection (1911) in Flara zambesiaca. The habitat is under severe threat from fisheries.

Buchnera crassifolia Engl.
Status: DD
Distribution: North
Only a single cited specimen far Zambia. Also known from Malawi.

Buchnera nitida Skan
Status: DD
Distribution: North
Also known from Malawi.

Buchnera pulcherrima R.E.Fr.
Status: DD
Endemism: Endemic
Distribution: North
Known only from the type collection (1911). Na actual site given.

Craterastigma plantagineum Hochst.
Status: DD
Distribution: North
Medicinal plant. Widespread at altitudes af 1,500–2,000 m. Could be a casmapalitan weed but this cannot be confirmed.

Limnaphila crassifolia Philcox
Status: DD
Endemism: Endemic?
Distribution: West
Type from Mwinilunga. Muddy riversides. Only 6 cm tall and probably easily averlaaked.

Selago thyrsoidea Baker var. *thyrsoidea*
Status: DD
Endemism: Near-endemic?
Distribution: East
Type from Malawi-Nyika.

STERCULIACEAE

Dombeya brachystemma Milne-Redh.
Status: DD
Distribution: West, South
Very wide distribution range.

TILIACEAE

Triumfetta grandistipulata Wild
Status: DD
Sandy flots in scrubby waadlond. Type from Kawanga (ungazetteered), by Fanshawe.

Triumfetta reticulata Wild

Status: DD

Distribution: West

In waste places and woodlands. Type is from Ndala by Fanshawe. Not known whether this is a weed. Requires verification.

URTICACEAE

Pouzolzia bracteosa Friis

Status: DD

Endemism: Endemic?

Distribution: Central/East

On alluvium near river areas. Collected only once in Luangwa Valley (1972). Probably related to *Pouzolzia fadenii* from the Kenyan coast. Locality is well-

collected. Only 5 cm tall. Not known whether it is endemic to Zambia.

VERBENACEAE

Clerodendrum sansibarense Gürke subsp. *sansibarense*

Status: DD

Endemism: Endemic?

Distribution: North

The habitat is dry evergreen forests (secondary forest). The species is widespread in high rainfall areas.

VITACEAE

Cyphostemma nanellum (Gilg & R.E.Fr.) Descouings ex Wild & R.B.Drumm.

Status: DD

Endemism: Endemic

Distribution: North

Found in burnt woodland. Known only from the type specimen.

Cyphostemma tenuissimum (Gilg & R.E.Fr.)

Descouings ex Wild & R.B.Drumm.

Status: DD

Endemism: Endemic

Distribution: North

Found on rocky ground. Known only from the type collected in 1911.



The tubers of edible orchids that are harvested for consumption are called *chikanda* or African polony in Zambia. (Photo: M.G. Bingham)



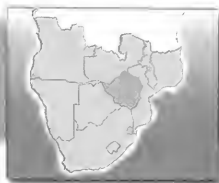
Satyrium buchananii, used as *chikanda*. (Photo: G. Williamson)



Brachycorythis angolensis, a dambo species used for *chikanda*. (Photo: G. Williamson)



Dambo areas are impacted by human disturbance in Zambia. (Photo: G. Williamson)



Anthony Mapaura* & Jonathan R. Timberlake†

Introduction

The flora of Zimbabwe, comprising around 4,500 species of vascular plants, is comparatively well-studied. Nevertheless, a comprehensive checklist and distribution maps for other than a few species are not yet available. This has made the compilation of a national plant Red Data List (RDL) difficult, as the conservation status of most species in the country is poorly documented. On the other hand, Zimbabwe has much botanical expertise and the RDL compilation process has drawn from this pool.

Indeed, the first attempt at listing species under threat was probably undertaken by Wild & Müller (1979) who mentioned 44 species as *Endangered* or *Vulnerable* and an additional 40 species as *Rare* (old IUCN categories). Threatened and protected species were discussed by Kimberley (1992), while a number of vegetation studies of smaller areas have documented species of particular interest or concern (for example, Timberlake *et al.* 1991, Timberlake & Mapaura 1992, Timberlake & Musokonyi 1994, Timberlake *et al.* 1998, and Drummond in Cunliffe 2000). Conservation of vegetation has been addressed by Wild (1968), Robertson (1986), Timberlake *et al.* (1991), and Timberlake & Müller (1994), amongst others.



Participants at the RDL Workshop held in Harare.

(Photo: J.S. Golding)

Major areas of endemism in Zimbabwe are the Chimanimani Mountains and the grasslands of the Great Dyke, both of which have been documented by Wild (1964, 1965). Moreover, many of Zimbabwe's threatened species are found in patches of moist forest of the Eastern Highlands and were found in the course of detailed field surveys (see Müller 1994a, 1999). More recently, attempts have been made by WWF to document and map threatened and endemic plant species for the miombo ecoregion (Gibson 1999, Mugodo 1999). Worldwide studies done by the IUCN and WCMC (Walter & Gillett 1998, Oldfield *et al.* 1998) also served as building blocks for this RDL compilation.

Methods

A SABONET workshop was held at the National Herbarium in Harare (16–21 October 2000) to discuss and assess the species on a list drawn up in advance. Data were collected from various sources, including herbarium specimens, literature (primarily *Flora zambesiaca*), and personal communications. Additional taxa were assessed and verification continued up until the present publication of results. Persons involved are listed in the Acknowledgements.

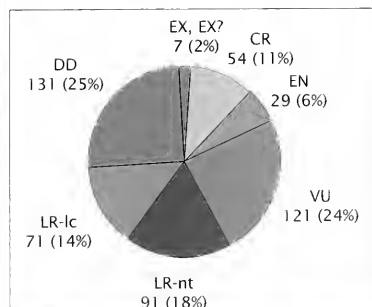


Figure 1. Summary of the number of taxa in the different IUCN categories.

Capital: Harare, largest city

Area: 390,759 km²

Languages: English (official), Shona, Ndebele

Currency: Zimbabwean dollar (Z\$)

Total plant species: 4,440

Total plant endemics: 214

Total RDL plants: 504

Focal RDL institution: SRGH

Number of Protected Areas: 12 National Parks, 1 Transfrontier Park (Mozambique–South Africa–Zimbabwe), and numerous other protected areas.

Population: 11,903,700 **Growth Rate:** 1.8% **Density:** 29.6 people/km²

Phytogeography: Mostly Zambezi-an, with Afromontane elements in the Eastern Highlands.

Flora: Dry miombo woodland, with mopane woodland and other woodland types dominating. Serpentine grasslands are found in the Great Dyke. Montane forest interspersed amongst high-altitude grasslands and heath is found in the Eastern Highlands.

Sources: Anonymous 2000, Stuart & Adams 1990, Timberlake & Müller 1994

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Assumptions

Various assumptions were made in allocating RDL categories, as in many cases data were insufficient for definitive categorisation.

Critically Endangered (CR) was used for species known only from very few indi-

viduals (<50) in forests.

Vulnerable (VU D2) was applied whenever a species had a limited distribution (fewer than five localities), not excessively low numbers of individuals, and there was no suggestion of declining status (numbers or habitat) or apparent threat, for example, species confined to Chirinda Forest or to the Lower Rusitu. These areas are well-pro-

ected and there is no evidence of major change in habitat. Also classified as VU D2 were species known only from the type specimen.

Chimanimani quartzite grassland endemics (Zimbabwe/Mozambique) were all classified as *Lower-Risk near threatened* (LR-nt), as they occur over a comparatively large area that is wellprotected and there is no evidence of change in conservation status. If a species is restricted to the peaks or marginal habitats, it was classified as VU D2.

Great Dyke endemics are spread over a large area, but are not particularly well-protected. They were all classified as *Lower-Risk least concern* (LR-lc), unless restricted to particular parts of the Dyke or known to be localised or rare, in which case they were classified as LR-nt or VUD2.

Species thought to be endemic to Zimbabwe, whatever their status, were given a threatened category, even if very low (for example, LR-lc). Otherwise only species that are threatened with extinction, even remotely, were given a category. Thus, species that show marked population decline, but which are very common and widespread, were regarded as not threatened and subsequently removed from the RDL.

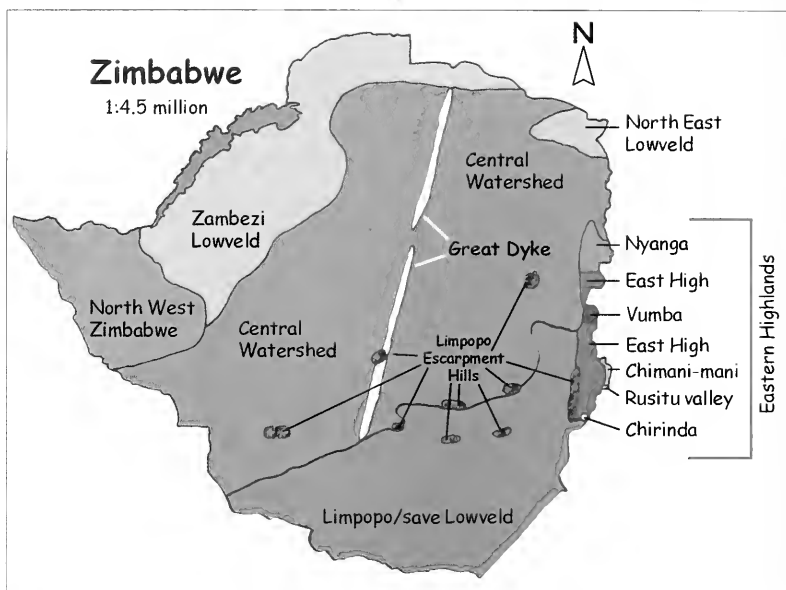
Utilised species were evaluated on the basis of their biological status, not their utilisation status (which may or may not be threatened).

Geographical Areas and Habitats

The geographical areas used in this RDL (Table 1) were determined using ecological and geographical criteria, and emphasised areas of known endemism, richness or threat. The habitat categorisation (Table 2) broadly followed physiognomy and moisture regime.

Results

A total of 504 plant species and infraspecific taxa were assessed and are presented here (Table 3). Of the assessed species, 224 are endemic or near-endemic, representing 44.4% of the entire RDL. Of these species, 71 are in a significant threat category (CR, EN or VU) (Figure 1). An analysis of Zimbabwean endemic species is being carried out and will be presented later (A. Mapaura, in prep.).



Geographical areas used in Zimbabwe RDL.

Table 1. Geographical areas of Zimbabwe used in the RDL.

Geographical area	Areas covered
Chimanimani	Mountains and immediate area.
Rusitu Valley	Haroni, Rusitu, and Makurupini forests.
Nyanga	Mountains, grasslands, forests, Honde Valley, and adjacent uplands.
Vumba	Mountains, grasslands, and forests.
Eastern Highlands	Mountains/uplands incorporating two or more of above. Also Himalaya and Stapleford.
Limpopo Escarpment	Roughly defined escarpment rising from Limpopo Valley, especially hills catching moist air, e.g. Matobo, Wedza, Bikita, Great Zimbabwe, Chipinge Uplands, Nyoni Hills.
Limpopo/Save Lowveld	Most of area below 900 m, including Gonarezhou National Park.
Northwestern Zimbabwe	Victoria Falls, Kazungula, Hwange National Park, Matetsi, western part of Kalahari sands, and area west of the Gwayi River.
Zambezi Lowveld	Most of area below 900 m, including Zambezi Escarpment, Kariba, Binga, and Sebungwe up to Gwayi River.
Northeastern Lowveld	Mazoe River Valley, Mudzi, and Rushinga.
Great Dyke	Grasslands and associated woodlands; north and south sections.
Chirinda	Chirinda forest and outliers.
Central Watershed	Central highveld backbone of country above 900 m, running from Plumtree, through Bulawayo, Gweru, and Kadoma to Harare; north to Karoi-Centenary-Bindura; east to Mutare/Nyanga; south to Chivhu/Masvingo
Widespread	More than three areas mentioned above.

Table 2. Habitats used in the RDL.

Habitat	Description
Moist forest (MF)	Rainforest (moist or dry), thick riparian woodland/forest. Mention if species is epiphyte (EPI).
Dry forest (DF)	Deciduous forest, thicket, and dry riparian woodland.
Moist woodland (MW)	Forest margins, kloof forest, miombo woodland—rainfall above 650 mm p.a.
Dry woodland (DW)	<i>Acacia</i> , <i>Combretum</i> , <i>Terminalia</i> , mopane woodlands—rainfall below 650 mm p.a.
Rocky (RH)	Bare rock, rocky slopes, rocky outcrops and stony ground.
Dambo (DM)	Seasonally waterlogged grasslands, mostly on the highveld.
Grassland (GR)	Upland grassland, often amidst boulders, edaphic grasslands; qualified by quartzite (Chimanimani) or serpentine (Great Dyke).
Wetland (WET)	Seasonally flooded areas, including very wet dambos and seeps.
Disturbed (DIST)	Disturbed land, usually resulting from agriculture.

A total of 88 families are represented in the RDL, with 55% of the species in nine families (Table 4); the Orchidaceae has by far the largest number of RDL taxa. Euphorbiaceae, Aloaceae, Asclepiadeae, Orchidaceae, and Asteraceae are mainly under threat from collectors for gardens and horticulture.

Areas and Habitats

The distribution of listed plants is not even across the country (Table 5). There is a high number on the Chimanimani Mountains (nearly all of which are quartzite grassland endemics, and very few of which are threatened), on the hills of the Limpopo Escarpment, in the forests and grasslands of the Eastern Highlands, and in the forests of the Rusitu Valley and Chirinda. The latter two areas cover less than 10 km² in total, yet species confined to one or the other within Zimbabwe account for 54 of the threatened species (25.5%). These areas should obviously be major conservation targets. A high number of taxa is found on the extensive Central Watershed, the most populated area of the country. Most threatened species here are found in dambos and moist grasslands. Almost all listed taxa found on the Great Dyke are endemic to Zimbabwe, but none are particularly under threat. The Limpopo Escarpment Hills, which are very limited in extent, support a number of particularly threatened species.

Table 6 shows the habitats of all the RDL species. Moist forest is the habitat with the highest number of threatened taxa (94 taxa or 27.3% of the total); this habitat covers less than 106 km² throughout the Eastern Highlands (Müller 1999). Grasslands (mostly submontane grasslands in Nyanga and Chimanimani, and those of the Great

Dyke) and dambos are also of limited extent across the country, yet these habitats support a high number of RDL taxa. The majority of the country's endemics are confined to quartzite or mineral-toxic grasslands. Dambos on the central watershed are a particularly threatened habitat owing to cultivation, drainage, and urban expansion. Many of the listed taxa from moist woodland are actually forest-edge taxa.

Discussion

This List has seen a great increase in numbers of both assessed and threatened taxa compared to that of Walter & Gillett (1998). This increase can be attributed to the fact that the present RDL is the result of much wider consultation and better consolidation of existing information. We must, none the less, keep in mind that the increase in numbers may also reflect the state of biodiversity conservation in Zimbabwe.

The forests of the Eastern Highlands harbour 44% of the species on this RDL, mainly because these forests form a unique habitat in the country and occupy a relatively small area. It is heartening to note that a substantial part of the forests are protected within the National Parks estate. Major threats to forest species are collectors, afforestation, and land conversion to agriculture. The greatest threat facing species on the RDL in general, however, is loss of habitat due to human activities such as mining, damming, and urban expansion. It is, nevertheless, still within our capacity to control and mitigate these factors.

There appears, moreover, to be a disproportionate representation on the List of succulents and orchids. This is probably

Table 3. Summary of the Zimbabwe RDL.

Category	Number of taxa
Taxa on RDL	504
Genera	257
Families	84
Endemic/near endemic taxa	224
Strict endemic taxa	178
Threatened taxa (EX, CR, EN, VU)	211
Lower Risk taxa (LR-nt, LR-lc)	162
Extinct (EX)	7
Critically Endangered (CR)	54
Endangered (EN)	29
Vulnerable (VU)	121
Lower-Risk near threatened (LR-nt)	91
Lower-Risk least concern (LR-lc)	71
Data Deficient (DD)	131

Table 4. Families with 10 or more RDL species.

Family	Number of taxa
Orchidaceae	72
Apocynaceae <i>sensu lato</i>	46
Euphorbiaceae	41
Fabaceae	33
Rubiaceae	25
Asteraceae	23
Acanthaceae	21
Scrophulariaceae	18
Aloaceae	17

due to our greater knowledge of these groups, as well as the perceived threat from collectors. These figures do not necessarily imply that these groups are indeed more under threat than other life forms or taxa. Clarification of many outstanding questions such as this can only be resolved by further field studies.

In addition, there are 224 endemics on the list. Zimbabwe therefore has not only a national responsibility to conserve these species, but also a global responsibility, although it is possible that some species may also occur in neighbouring countries. It would be a pity if these species were lost due to negligence and lack of enforcement of existing laws.

Finally, it should be noted that there are probably more threatened species in Zimbabwe than what is presented here. Field

Table 5. Distribution of listed taxa by geographical area (Total exceeds list number owing to presence of some taxa in two or more areas).

Area	Number of listed taxa	Number of threatened taxa (CR, EN & VU)	Percentage of total threatened taxa
Chimanimani	79	25	11.8
Nyanga	43	19	9
Vumba	12	7	3.3
Chirinda	31	25	11.8
Eastern Highlands*	214	94	44.3
Central Watershed	70	14	6.6
Great Dyke	30	8	3.8
Limpopo Escarpment Hills	40	20	9.4
Rusitu Valley	59	48	22.6
Limpopo/Save Lowveld	61	29	13.7
Northwestern Zimbabwe	18	9	4.2
Zambezi Lowveld	22	8	3.8
North Eastern Lowveld	2	1	0.5
Unspecified	27	3	1.4
Widespread	8	1	0.5

*Number of taxa noted for Eastern Highlands includes taxa limited to Chimanimani, Nyanga, Vumba, and Chirinda, as well as more widespread upland taxa.

Table 6. Habitats of RDL taxa (Total taxa exceed list number owing to presence of some in two or more habitats).

Habitat	Number of listed taxa	Number of threatened taxa (CR, EN & VU)	Percentage of total threatened taxa
Moist forest	138	94	44.3
Dry forest	12	6	2.8
Moist woodland	41	25	11.8
Dry woodland	64	22	10.4
Rock and outcrops	31	14	6.6
Grassland	130	37	17.5
Dambos	24	2	0.9
Wetland	13	3	1.4
Disturbed	1	1	0.5
Unknown	65	12	5.7

Table 7. Endemism on the RDL for Zimbabwe.

Endemism	Number of taxa
Confirmed endemic	178
Suspected endemic	9
Confirmed near-endemic	27
Suspected near-endemic	10
TOTAL	224

surveys should be organised to verify species categorised as *Data Deficient* (DD) and others. The high number of DD taxa is an indicator of the future efforts required to resolve these issues, as some could well be categorised as *Critically Endangered*.

Zimbabwe has satisfactory legislation concerning the conservation of the environment, but more can still be done especially in enforcing these laws, educating people, and setting priorities for conservation. We hope that this list will generate much interest in the gathering and interpretation of data so that our conservation strategies can be improved.

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Alpine pool on Mount Inyangani, showing *Cyrtanthus brevifolius*. (Photo: J. Timberlake)

EXTINCT & THREATENED

ACANTHACEAE

Brochystephanus africanus S.Moore

Status: CR B1B2c

Threats: Collection

Distribution: Chimanimani

Site: Mermaids Grotto

Habitat: Moist forest

There is a possibility that the area has become cleared and the plants are gone. Grows in rocky area.

Threatened by horticultural collectors.

Peristrophe serpenticola K.Balkwill & Campb.-Young

Status: VU D2

Endemism: Endemic

Distribution: Great Dyke (N)

Site: Nyamunyeche (Grassland), Vanad Pass

Habitat: Grassland—Serpentine

On termite mounds. Serpentine soils. Only five specimens in SRGH. Was last collected in 1978. It is said to be more common than herbarium collections suggest.

Sclerchiton kirkii C.B.Cl.

Status: EN C2a

Threats: Habitat degradation

Distribution: Rusitu Valley

Site: Haroni-Makurupini

Habitat: Moist forest

Marginal ecotonal forest species. Scattered habitats which are threatened.

ALANGIACEAE

Alangium chinense (Lour.) Harms

Status: CR B1B2eD

Distribution: Nyanga, Chirinda

Site: Mutarazi Falls, Chirinda forest

Habitat: Moist forest

Known from two localities from the late 1970s. The subpopulation at Mutarazi Falls has only two mature individuals; the subpopulation in Chirinda Forest has about seven young individuals. Field surveys were unsuccessful at rediscovering them.

ALOACEAE

Aloe ballii Reynolds var. *ballii*

Status: VU D2

Endemism: Endemic

Threats: Collection

Distribution: Chimanimani

Site: Haroni Gorge, confluence of Haroni and Chisengu River, Chimanimani

Habitat: Rocky/Grassland—Quartzite

Occurs only at an altitude of about 500 m in the Haroni River Gorge and a short distance from the gorge at the southern end of the mountain. Inaccessible habitat, therefore few threats (horticultural collectors).

Aloe ballii Reynolds var. *makurupiniensis* Ellert

Status: VU C1

Endemism: Near-endemic?

Threats: Fires

Distribution: Rusitu Valley

Site: Haroni Gorge, Haroni and Chisengu confluence

Habitat: Grassland—Quartzite

On quartzite. Occurs from about 500 m near the Haroni Gorge up to about 900 m on the southern end of the main Chimanimani Mountain. Habitat burnt in very dry years.

Aloe collina S.Carter

Aloe saponaria (Aiton) Haw.

Status: VU A1cD2

Endemism: Endemic

Distribution: Nyanga

Site: Restricted to the area around Troutbeck

Habitat: Grassland?

Aloe hazeliona Reynolds

Status: VU B1C2a

Endemism: Near-endemic?

Threats: Collection

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Quartzite grassland at an altitude of 1,500 m. Fairly common. A few disjunct subpopulations known in the wild.

Aloe howmonii Reynolds

Status: VU C2a

Endemism: Endemic

Threats: Collection

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Quartzite grassland. Altitude greater than 1,600 m. Fairly common. A few disjunct subpopulations known in the wild.

Aloe lutescens Groenew.

Status: VU B1B2d

Endemism: Near-endemic?

Distribution: Limpopo/Save Lowveld

Site: Gonarezhou, Buffalo Bend to Malapati on

Nuanetsi River

Aloe myriacantha (Haw.) Schult. & Schult.f.

Status: VU A1c

Distribution: Eastern Highlands

Site: Nyanga to Chimanimani

Habitat: Rocky

Aloe ortholopha Christian & Milne-Redh.

Status: VU A1dA2b

Endemism: Endemic

Threats: Agriculture, mining

Distribution: Great Dyke (N)

Site: Pass between Harare and Banket to Banirembizi

at the end of Mavhuradonha Mountains

Habitat: Grassland—Serpentine

Occurs on serpentine soils in open, grass-covered country. Occurs on slopes and along ridges. The grass is frequently burnt but little harm seems to be done to the aloe, as its centre is protected by its thick flesh. Young seedlings were observed.

Aloe plowessii Reynolds

Status: VU B1B2aC2a

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani, Muhohwa to south near Makurupini

Falls

Habitat: Grassland—Quartzite

On quartzite.

Aloe pretoriensis Pole-Evans

Status: VU A1aC2c

Threats: Fire, deforestation

Distribution: Eastern Highlands

Site: South Chimanimani village to north of Nyanga,

between Mutare and Headlands

Habitat: Grassland?

Not fire-tolerant and susceptible to bush clearing.

Aloe rhodesiana Rendle

Status: VU B1B2cC2a

Threats: Afforestation

Distribution: Eastern Highlands

Site: Nyanga to Vumba to Chimanimani

Habitat: Grassland?

Habitat reduced by commercial forestry (pine and gum trees).

Aloe spicata L.f.

Aloe tauri L.C.Leach

Status: VU C1C2a

Threats: Fire

Distribution: Limpopo Escarpment, Limpopo/Save

Lowveld

Site: Eastern Province from Cashel to South of

Chipinge; Matibi Na. 1 area (Mnene Mission, M'shunga

Nibure-God's Needle 90 km east of Mount Igar, Mweza

Range), possibly Triangle

Habitat: Rocky

Grows in dense masses on granite hills. Susceptible to

fire. Large numbers of the South African form of this

species occur in Limpopo Province (South Africa). Known

only from three localities in Matibi Na. 1 and surrounds.

Aloe suffulta Reynolds

Status: CR B1B2bC2aD

Distribution: Limpopo/Save Lowveld

Site: Zamuchiya (Middle Save)

A very restricted area in the middle Save. Generally not

a collector's species. Only one locality is known in

Zimbabwe.

Aloe wildii (Reynolds) Reynolds

Status: VU C1D1

Endemism: Near-endemic

Threats: Grazing/browsing

Distribution: Chimanimani

Site: The Corner/Martin Forest Reserve (from Muhohwa

to southern end of range)

Habitat: Grassland—Quartzite

Eaten by some animals at ground level. Occurs on

quartzite, grassland, at an altitude of 1,500 m.

AMARYLLIDACEAE

Scodoxus pole-evansii (Oberm.) Friis & Nordal

Haemanthus pole-evansii Oberm.

Status: VU D2

Endemism: Endemic

Distribution: Nyanga

Site: Nyamungura River (Tea Estates), Nyanga

Habitat: Grassland

Grassland. Specially protected plant in Zimbabwe.

Collectable species, though no decline can be

suggested. Recorded only a few times from the Nyanga area.

ANACARDIACEAE

Trichoscypho ulugurensis Mildbr.

Status: CR B1B2c

Threats: Collection, agriculture

Distribution: Rusitu Valley

Site: Haroni-Makurupini-Rusitu, Chimanimani

Habitat: Moist forest

Seedlings were found at both sites.

ANNONACEAE

Monanthotaxis buchanonii (Engl.) Verdc.

Status: CR D

Distribution: Vumba

Site: Burma Valley

Only one record. Specimen was collected at an altitude

of 1,000 m in rainforest on an unprotected private

property. One individual seen. Shrub or tree.

APIACEAE

Alepidea amatymbica Eckl. & Zeyh.

Status: CR B1B2ccC2a

Threats: Collection

Distribution: Eastern Highlands

Site: Bundi Park, Engwe, Himalaya

Habitat: Grassland

Small bush. Bark and roots used for medicinal purposes. Historically rare. Very few protected.

APOCYNACEAE

Adenium multiflorum Klotzsch

Adenium obesum (Forssk.) Roem. & Schult. var. *multiflorum* (Klotzsch) Codd

Status: EN A1ad

Threats: Collection, grazing/browsing

Distribution: Limpopo/Save Lawveld

Habitat: Dry woodland

Heavily collected in past; whole plants are removed. Babaans have been observed uprooting plants in the Limpopo area. Occurs northwards to East Africa. Collected for medicinal and horticultural properties. Widespread in southern Zimbabwe.

Pachypodium saundersii N.E.Br.

Status: VU A1cd B1 B2c

Threats: Collection

Distribution: Limpopo/Save Lawveld

Site: Save Valley, Runde River, Chipinge

Habitat: Dry woodland

Zimbabwe's only *Pachypodium*. A specially protected species in Zimbabwe. Habitat severely fragmented, declining. Widely collected.

Strophanthus courmontii Sacleux ex Franch.

Status: VU D2

Distribution: Zambezi Lowveld, Rusitu Valley

Site: Mana Paals, Harani-Rusitu

Habitat: Dry forest, moist forest

Riverine. Two localities known.

Voacanga africana Stapf

Status: CR D

Threats: Collection, agriculture

Distribution: Rusitu Valley

Site: Harani-Rusitu

Habitat: Moist forest

Only at low altitudes, about 340 m. Common in Mozambique.

ARACEAE

Zamioculcas zamiifolia (Lodd.) Engl.

Status: VU D2

Threats: Collection, agriculture

Distribution: Rusitu Valley

Site: Harani, Makurupini, Rusitu

Habitat: Moist forest

ARECACEAE

Borassus aethiopicum Mart.

Status: CR A1adB1B2ce

Threats: Harvesting, collection

Distribution: Rusitu Valley, Limpopo Escarpment

Site: Ngorima Reserve, Bangala Falls on Mutirikwi

River, north of the main access to Bangala Dam from the Western turn-off in Chiredzi, 3 km northeast, east

and southeast of Harani Gorge, Harani-Rusitu

Habitat: Moist woodland

Besides Harani-Rusitu, a few other planted subpopulations are known. Common in Mozambique and other countries. This species is now under threat from people who cut down mature plants to make a local brew. This practice has increased in the last few years.

Raphia farinifera Gaertn.

Status: VU B1B2bcdC2a

Threats: Agriculture

Distribution: Eastern Highlands, Central Watershed

Site: Chimanimani, Stapleford, Palm Block,

Mavuradonha, Vumba

Habitat: Moist woodland

Main population in the Palm Block has probably increased because of conservation measures, in past years. A few subpopulations known in the country. Generally in farming areas. Common name is 'muware'.

ASCLEPIADACEAE

Brachystelma richardsii Peckover

Status: VU A1ac

Endemism: Endemic

Distribution: Central Watershed, NW Zimbabwe

Site: Kadoma—Kariba, Kamativi

Habitat: Moist woodland

Open, flat miamba woodland in greyish brown loamy soil. The distribution of this species probably extends from Kadoma to Kariba. There is overgrazing in this area but this is reported to increase the diversity of various *Asclepiadoceae*.

Hoodia currorii (Hook.) Decne. subsp. *lugardii*

(N.E.Br.) Bruyns

Status: VU C1D1

Distribution: Limpopo/Save Lawveld

Site: SW Zimbabwe

Habitat: Dry woodland

Appears to have been found in a very limited area in southwestern Zimbabwe, very few plants have been found. Well-known from Botswana's Tuli area.

Huernia hislopitii Turrill subsp. *robusta* L.C.Leach & Plowes

Status: VU B2ce

Endemism: Endemic

Distribution: Widespread

Site: Sengwa River (Sengwa Research Station), Gokwe,

Mabikwa near Lupane Hotel, Lupane, Robin's Camp

(Hwange National Park), Sebakwe Farm and Dam

(Kwekwe), Halfway House (between Lupane and

Victoria Falls), Bongola Farm (Nyamandhlavu),

Nyamandhlavu Saw Mills

Habitat: Dry woodland

Scattered distribution and rarely found. It is often associated with mopane woodland.

Huernia longituba N.E.Br. subsp. *cashelensis*

L.C.Leach & Plowes

Status: VU B1B2c

Endemism: Endemic

Distribution: Eastern Highlands

Site: Mutambara (Chimanimani), Chatora Farm (Banti

Forest Reserve), Biriwiri (Chimanimani), West of

Chipinge (New Years Gift), southeast Mutema to west of

Chipinge (near Tanganda River)

Habitat: Rocky

Limited distribution. Grows on rocky Umkando shale.

Confined to the Eastern Highlands. This plant was

originally known from Cashel-Mutambara area but is

now known to have a wider distribution.

Huernia volkartii Peitsch ex Werderm. & Peitsch

var. *repens* (Lavranos) Lavranos

Status: EN D

Threats: Damming

Distribution: Limpopo Escarpment—Nyoni Hills

Site: Takwe-Mukarsa Dam

Habitat: Moist woodland

Found in mass in the mist belt. Known from only a single locality with a handful of individuals. Unlikely to be found elsewhere in the vicinity of the locality.

Orbeopsis caudata (N.E.Br.) L.C.Leach subsp.

rhodesiaca (L.C.Leach) L.C.Leach

Status: CR D

Distribution: Limpopo Escarpment—Matapos

Site: Matapos to BallaBalla area

Habitat: Moist woodland

Scattered and not easily seen in miamba on granite sands. A dwarf form is known to exist.

Orbeopsis lutea (N.E.Br.) L.C.Leach subsp. *lutea*

Status: VU D2

Distribution: Central Watershed

Site: Bulawayo

Habitat: Rocky

Sparsely scattered on a rocky ground which is not arable.

Orbeopsis valida (N.E.Br.) L.C.Leach

Status: VU D2

Collected only a few times in Zimbabwe. Is scarce.

Pachycymbium rogersii (L.Bolus) M.Gilbert

Status: CR D

Threats: Agriculture

Distribution: Limpopo/Save Lowveld

Site: Chibwe

Habitat: Disturbed

Very restricted distribution. Area is heavily ploughed and only a few individuals were seen.

Tavaresia barklyi (Dyer) N.E.Br.

Status: EN A1ca2cb2cd

Distribution: Northwestern Zimbabwe, Limpopo/Save

Lawveld

Site: Beitbridge

Habitat: Rocky

Very rare in Zimbabwe. Restricted distribution in southwestern Zimbabwe. Very difficult to find. Found in stony ground. Apparently reported to occur in Hwange and this should be verified.

ASPLENIACEAE

Asplenium christii Hieron.

Status: VU D2

Distribution: Chirinda

Site: Chirinda forest

Habitat: Moist forest

Quite common in Chirinda Forest. This represents the only *Flora zambesiaca* record. Also occurs in South Africa, Kenya, and Tanzania.

Asplenium mossambicense Schelpe

Status: VU D2

Distribution: Chirinda

Site: Chirinda forest

Habitat: Moist forest

All the localities are isolated. Known only from Zimbabwe, Mozambique and Kenya.

Asplenium parablattophorum A.Braithwaite

Status: VU D1D2

Endemism: Near-endemic

Distribution: Vumba, Rusitu Valley

Site: Harani and Vumba

Habitat: Moist forest

Was taxonomically split from *A. aethiopicum* based on chromosomal studies. Known from the border between Mozambique and Zimbabwe. Found on the forest floor of evergreen forests.

Asplenium pellucidum Lam. subsp. *horridum*

(Hieron.) Schelpe

Status: VU B1 B2c

Distribution: Rusitu Valley

Site: Harani Gorge

Habitat: Moist forest

Low altitude evergreen forest. Often in spongy and seepage areas in dense shade. Type from Tanzania. Also in Mozambique and Kenya.

Asplenium unilaterale Lam.

Status: VU D2

Distribution: Chirinda

Site: Chirinda forest

Habitat: Moist forest

Extremely rare. Last collected in 1951. Only a single report that it was recently seen. Also occurs in Malawi, Madagascar, Mauritius and the Mascarenes. Widespread in Tropical Africa.

ASTERACEAE

Geigeria schinzii O.Hoffm. subsp. *sebungweensis*
Wild
Status: VU B1B2c
Endemism: Endemic
Distribution: Zambezi Lowveld
Site: Gokwe, Sebungwe (plateau of the southern Zambezi Valley)
Habitat: Dry woodland
Known mainly from the Gokwe oreo.

Helichrysum maestum Wild
Status: VU D2
Endemism: Endemic
Distribution: Chimanimani
Site: Mount Peza
Habitat: Grassland—Quartzite
Quartzite endemic. Known only from the croggs on Mount Pezo.

Senecio aetfatusensis B.Nord.
Status: VU D2
Endemism: Endemic
Distribution: Chimanimani
Site: Chimanimani
Habitat: Grassland—Quartzite
Quartzite endemic. Altitude of 1,400 m. Habitat is not under threat. Could be more widespread as the species was recently described.

Vernonia graniticola G.V.Pope
Status: VU D2
Endemism: Endemic
Distribution: Central Watershed
Site: Ngomokurira
Habitat: Wetland
Shallow soils and seepage oreos on granite outcrops.

BIGNONIACEAE

Fernandoa magnifica Seem.
Status: EN C1C2b
Threats: Agriculture
Distribution: Limpopo/Save Lowveld
Site: Save Valley, Runde
Habitat: Moist woodland
Rare, scattered and restricted to sand. Unprotected. Not used for timber. Habitat lost because of pressure for agricultural land.

BURSERACEAE

Commiphora neglecta I.Verd.
Status: CR B1B2bD
Distribution: Limpopo/Save Lowveld
Site: One hill in Chisumbanje
Habitat: Rocky
A communal oreo. Habitat on rock outcrops.

CANELLACEAE

Warburgia salutaris (Bertol.f.) Chiov.
Status: CR A1d B1B2abcdeC1C2a D
Threats: Harvesting
Distribution: Limpopo Escarpment-Chippinge
Site: Tanganda River in Tanganda Tea Estates, Chikore Mission, Ngungunyana Forest
Habitat: Moist woodland
Historically rare in Zimbabwe. Fewer than ten mature plants are known to grow in the wild in Zimbabwe. This could be a result of collectors (medicinal). The plant is believed to be extinct by some people but others believe there could still be one or a few individuals remaining.

CAPPARACEAE

Maerua salicifolia Wild
Status: VU D2
Endemism: Endemic
Threats: Agriculture, browsing
Distribution: Zambezi Lowveld
Site: Mopane fringing Malabola Flats in Gokwe, Segwa Research Station, Goredema Diptank in Chief Chireyas area (between Bumi and Kaenga River), Lusulu Veterinary Ranch in Binga, Sengwe
Habitat: Dry woodland
Mopane woodland, bare ground and sandy soils. Habitat under threat especially from agriculture and browsing by elephants.

CARYOPHYLLACEAE

Dianthus chimanimaniensis Hooper
Status: VU D2
Endemism: Near-endemic?
Distribution: Chimanimani
Habitat: Grassland—Quartzite
Status will probably need to be revised.

CELASTRACEAE

Maytenus chasei N.Robson
Status: VU D2
Endemism: Near-endemic
Distribution: Vumba
Site: Bunga Forest, Penhalonga to Mozambique
Habitat: Moist forest
Endemism plausibly.

COMBRETACEAE

Combretum coriifolium Engl. & Diels
Status: EN B1B2cC2b
Threats: Habitat degradation
Distribution: Rusitu Valley
Site: Haroni-Rusitu, East of Haroni River, Chisengu River, Sabie River, Chusenga River, Rusitu, Makurupini-Rusitu area
Habitat: Moist forest
Habitat threatened. A rare plant in Zimbabwe with a very limited distribution.

Combretum umbricola Engl.
Status: CR B1B2bcC2aD
Threats: Habitat degradation
Distribution: Limpopo Escarpment—Chippinge
Site: Chippinge
Habitat: Dry forest
Found near Chippinge in a gully oreo. Has a significant range and altitude extension, restricted oreos which are heavily under threat. Known from only two localities; both are now heavily degraded. Only one record in the herbarium. This is a very rare plant.

COMMELINACEAE

Triceratella drummondii Brenan
Status: EX?
Threats: Habitat degradation
Distribution: Limpopo/Save Lowveld
Site: Chitrapudzi in Beitbridge
Habitat: Wetland
Seepage on Cretaceous sandstone. Recently found in Mozambique at a locality more than 1,000 km from the type locality in Zimbabwe. Habitat on the edges of dry forests and Cretaceous sandstone is restricted in Zimbabwe. Type locality degraded.

CONNARACEAE

Cnestis polyphylla Lam.
Status: VU D2
Distribution: Chirinda
Site: Chirinda forest
Habitat: Moist forest

Santaloides afzelii Schellenberg
Status: VU D2
Threats: Collection
Distribution: Rusitu Valley
Site: Haroni-Makurupini
Habitat: Moist forest
Plenty of seedlings and a few mature plants.

CONVOLVULACEAE

Ipomoea verrucisepala Verdc.
Status: VU D2
Endemism: Endemic
Distribution: Grassland
Site: Umvukwes Range in Mpinga Pass, Murahwa's Hill in Mutare
Habitat: Grassland—Moist woodland
Woodland and roadsides. Not endemic to the Great Dyke; also recorded from Mutare.

COSTACEAE

Costus afer Ker Gawl.
Status: VU D2
Threats: Collection
Distribution: Rusitu Valley
Site: Haroni-Makurupini
Habitat: Moist forest

CRASSULACEAE

Crassula fragilis R.Fern. var. *suborbicularis* R.Fern.
Status: VU D2
Endemism: Endemic
Distribution: Eastern Highlands
Site: Fargell Farm, Chippinge
Habitat: Moist woodland
Occurs in massive shale outcrops, in rock cracks and very thin soil, in shade. Known from type specimen only.

CUCURBITACEAE

Acanthosicyos naudinianus (Sond.) C.Jeffrey
Status: VU B1B2c
Distribution: Northwestern Zimbabwe, Limpopo/Save Lowveld
Site: Kazungulu, Hwange National Park, Gonarezhou National Park
Habitat: Dry woodland
On deep sandy soils.

Cyclantheropsis parviflora (Cogn.) Harms
Status: VU A1aB2c
Distribution: Zambezi Lowveld, Limpopo/Save Lowveld
Site: Kariba Gorge, Umvumvumu River
Habitat: Dry woodland
Lowveld, nowhere common, 180–900 m.

Peponium caledonicum (Sond.) Engl.
Status: VU D2
Distribution: Limpopo Escarpment—Matopos
Site: Matopos
Habitat: Moist forest
Probably more sites, not recorded from elsewhere nor in Flora zambesiaca as occurring in Zimbabwe.

Zehneria scabra (L.f.) Sond. subsp. *argyrea* (A.Zimm.) C.Jeffrey var. *chirindensis* C.Jeffrey
Status: VU D2

Endemism: Endemic
Distribution: Chirinda
Site: Chirinda forest
Habitat: Moist forest

Cleorings and margins of rainforest. The taxonomy may need further examination.

CUPRESSACEAE

Juniperus procera Hochst. ex Endl.

Status: CR D

Distribution: Nyanga
Site: Nyahokwe Hill in Van Niekerk Ruins
Habitat: Moist woodland

Hove viable seed in the Zimbabwe Botanical Garden. In Zimbabwe this species has only been recorded from Nyongo on Ziwo Form. Strongly suspected that this individual was planted there. This is a specially protected species in Zimbabwe, but the oreo is not conserved. Also occurs in Malawi and further afield. Global status LR-nt.

CYATHEACEAE

Cyathea mossambicensis Baker

Status: VU C2a

Distribution: Nyanga, Chirinda
Site: Near Chirinda—next to Tea Estate, Aberfoyle Tea Estates
Habitat: Moist forest
Limited distribution. Probably vulnerable far all the countries. Protected at Aberfoyle. Frequent in Malawi.

Cyathea sp. cf. *C. humilis* Hieron.

Status: EN B1B2acd

Threats: Habitat degradation
Distribution: Rusitu Valley
Site: Haroni, Makurupini
Habitat: Moist forest
The only record of the Flora zambesiaca oreo. Altitude of 380 m. Known from the following record collected in 1982: J.E.Burrows 2788 (K, Buffelskloof Herbarium). Collected below waterfalls.

Cyathea thamsanii Baker

Status: CR D

Distribution: Vumba, Limpopo Escarpment—Bikita
Site: Northern Vumba, Bikita
Habitat: Moist forest
Nat known if it is still there, less than 25 mature individuals were seen in the late 1970s. The habitat is probably stable but not protected.

DICHAPETALACEAE

Dichapetalum madagascariense Pair.

Status: EN D

Threats: Collection
Distribution: Rusitu Valley
Site: Haroni-Makurupini
Habitat: Moist forest
Only recorded from Haroni-Makurupini forest. Very rare. Very low numbers of individuals.

EBENACEAE

Diaspyros hoyleana F.White subsp. *angustifolia* F.White

Status: CR D

Threats: Collection
Distribution: Rusitu Valley
Site: Haroni-Makurupini
Habitat: Moist forest

One plant seen in Zimbabwe, but more frequent in Mozambique. No known change in species numbers.

EUPHORBIACEAE

Bridelia atraviridis Mull.Arg.

Status: CR C2aD

Threats: Collection, agriculture
Distribution: Rusitu Valley, Chirinda
Site: Rusitu forest, Chirinda forest
Habitat: Moist forest
Habitat is restricted.

Clutia monticola S.Moore var. *stelleraides* (S.Moore) Radcl.-Sm.

Clutia stelleraides S.Moore

Status: VU D1 D2
Endemism: Endemic
Threats: Habitat degradation
Distribution: Eastern Highlands
Site: Mutare, possibly northern Chimanimani
Habitat: Grassland
Submontane grassland. Altitude: 1,525–1,830 m. The oreo has undergone changes in habitat.

Clutia sessilifolia Radcl.-Sm.

Status: VU D2
Endemism: Endemic
Distribution: Chimanimani
Site: Summit of Binga Mountain
Habitat: Rocky
High altitude (1,980–2,420 m) on quartzite. Occasionally on rocky mountain summits.

Croton leuconeurus Pax

Status: CR B1B2cbd

Threats: Browsing, alien plant infestation
Distribution: NW Zimbabwe
Site: Victoria Falls
Habitat: Moist woodland
Only known from above Victoria Falls. Riverine fringing habitat. Narrow habitat. Habitat threatened by animals, mainly elephants, which open up the forest for plant invaders (Lantana camara).

Euphorbia acervata S.Carter

Status: VU B1B2cD2

Endemism: Endemic
Distribution: Great Dyke (N & S)
Site: Umvukwe Hills, Mtoroshanga Pass, near Mpinga, 1 km north of Ngezi Dam, Otto Mine
Habitat: Grassland—Serpentine
*In grass amongst rocks in open woodland. 1,400–1,700 m. The habitat is serpentine grassland. Differs from *E. tortistyla* in producing more compact habit of small rounded 'cushions' (hence the name: acervatus = in heaps).*

Euphorbia confinalis R.A.Dyer subsp. *confinalis*

Status: VU A1c

Distribution: Limpopo Escarpment—Chippinge
Site: Rushinga District, Mount Silinda, Chippinge District, Sabi Valley
Habitat: Dry woodland

Euphorbia confinalis R.A.Dyer subsp. *rhodesiaca* L.C.Leach

Status: VU A1c

Endemism: Endemic
Distribution: Limpopo Escarpment—Bikita
Site: Moodies Pass, (Bikita), Hendriks Pass (southern Matopos), Chivi
Habitat: Dry woodland
Known from western and southern Zimbabwe.

Euphorbia decidua Bally & L.C.Leach

Status: EN A1cdB2ce

Threats: Collection
Distribution: Zambezi Lawveld, Zambezi Escarpment
Site: Hurungwe, Guruve, Makande districts
Habitat: Moist woodland
Very widespread.

Euphorbia dissitispina L.C.Leach

Status: VU D2

Endemism: Endemic

*Known only from the type locality and described from cultivated material. Could be a weak form of *E. malevola*.*

Euphorbia fartissima L.C.Leach

Status: VU A1acB2c

Distribution: Northwestern Zimbabwe
Site: Zambezi River near Victoria Falls, scattered colonies east from Victoria Falls to Deka/Zambezi junction, and south to Matetsi River, Hwange and as far south as the Kapata River
Habitat: Dry woodland

Euphorbia halipedicola L.C.Leach

Status: VU A1c

Distribution: Limpopo Escarpment—Chippinge
Site: Chippinge District, Sabi Valley
Scattered and uncommon. Reported from Mozambique.

Euphorbia lividiflora L.C.Leach

Status: VU A1c

Distribution: Limpopo/Save Lowveld
Site: Sabi Valley, Rupepi, Gonarezhou
Few scattered records only.

Euphorbia maleolensis Phillips

Status: EN A1acA2cB1B2c

Threats: Habitat degradation, collection
Distribution: Central Watershed
Site: Matabeleland South
Reported west of Bulawayo.

Euphorbia memorialis R.A.Dyer

Status: VU B1B2acC2a

Endemism: Endemic
Threats: Mining
Distribution: Great Dyke (N)
Site: Umvukwe Mountains, between Mutoroshanga and Horseshoe
Habitat: Grassland—Serpentine
Affected by chrome mining. Large-scale chrome mining and pick and shovel mining.

Euphorbia rugasiflora L.C.Leach

Status: VU C2a

Endemism: Near-endemic?
Distribution: Chimanimani
Site: Northern Chimanimani (The Corner)
Habitat: Grassland—Quartzite
First described in 1990. The type locality probably has about 60 plants, and is protected by rangers. Fruit is bright red.

Euphorbia trichadenia Pax var. *gibbsiae* N.E.Br.

Status: EN A1cdB1B2c

Endemism: Endemic
Threats: Habitat degradation
Distribution: Central Watershed
Site: Matopos, Harare
Scattered distribution in western and central parts of Zimbabwe.

Mallotus appasitifolius (Geiseler) Mull.Arg. var.

appasitifolius forma *palcycyatrichus* Radcl.-Sm.

Status: CR B1B2abc

Endemism: Endemic
Distribution: Chirinda
Site: Chirinda forest
Habitat: Moist forest
Occurs in mixed evergreen forest, in drier parts of moist habitats, at an altitude of 1,000 m. Found in small unprotected patches.

Necepsia castaneifolia (Baill.) Bouchat &

J.Léonard subsp. *chirindica* (Radcl.-Sm.) Bouchat & J.Léonard

Neopalissya castaneifolia subsp. *chirindica* Radcl.-Sm.

Status: VU D2

Endemism: Endemic
Distribution: Limpopo/Save Lowveld
Site: Chirinda forest
Habitat: Moist forest

A small understory tree of submontane evergreen forest. Altitude of 1,100–1,160 m. No habitat changes. No evident threats.

Suregada procera (Prain) Croizat

Status: VU B1B2cD1

Distribution: Chirinda

Site: Chirinda forest

Habitat: Moist forest

Suregada zanzibariensis Baill.

Status: VU D2

Distribution: Limpopo/Save Lowveld

Site: Gonarezhou National Park

Habitat: Dry forest

Cretaceous sandstone enclosed Androstachys woodland. In forest, woodland and salt marshes. Well-represented outside Zimbabwe. Several localities in Gonorozhou.

Tannodia swynnertonii (S.Moore) Prain

Status: VU B1B2cD2

Distribution: Chirinda

Site: Chirinda forest

Habitat: Moist forest

FLACOURTIACEAE

Bivinia jalbertii Tul.

Status: CR C1

Threats: Forestry exploitation

Distribution: Limpopo Escarpment—Nyoni, Chipinge

Site: Mjenja Hills, Nyoni Hills, Chivi/Chipinga

Habitat: Moist woodland

It was probably dispersed by wind to more localities than are currently known in an area stretching from Chipinge to Bongolo. Extremely rare tree.

Homalium abdessammadii Asch. & Schweinf.

subsp. *wildemanianum* (Gilg) Wild

Status: CR B1B2cD2

Threats: Habitat degradation, alien plant infestation

Distribution: NW Zimbabwe

Site: Above Victoria Falls

Habitat: Moist woodland

Riverine fringes and surrounding ponds. Narrow

habitat. Elephants damage the habitat, Lantana camara poses a threat.

Scolopia mundii (Eckl. & Zeyh.) Warb.

Status: CR D

Distribution: Nyanga, Chimanimani

Site: Nyamingura Valley (Nyanga), Gwendingwe Estate

(Chimanimani), western slope of Mount Inyangani on

Circular Drive

Habitat: Moist forest

One locality is protected and the other one is not. Rare species.

HAMAMELIDACEAE

Trichocladus ellipticus Eckl. & Zeyh. subsp.

malosanus (Baker) Verdc.

Status: VU D1D2

Threats: Collection, agriculture

Distribution: Nyanga, Rusitu Valley

Site: Haroni-Rusitu, Nyazengu

Habitat: Moist forest

Not a common species.

HIPPOCRATEACEAE

Hippocratea goetzei O.Loos.

Status: VU B1B2cD2

Threats: Habitat degradation

Distribution: Chirinda

Site: Chirinda forest

Habitat: Moist forest

In Chirinda and some outliers. There is one outlier that is seriously threatened.

Salacia erecta (G.Don) Walp.

Status: CR D

Distribution: Nyanga, Rusitu Valley

Site: Mutarazi, Chisenge gorge towards Haroni

Habitat: Moist forest

Two immature plants in each area.

Salacia leptoclada Tul.

Status: EN C2a

Threats: Collection, agriculture

Distribution: Rusitu Valley

Site: Haroni-Rusitu

Habitat: Moist forest

Occurs in small patches of transitional woodland to forest. Narrow habitat in fringe forest.

ICACINACEAE

Pyrenacantha kirkii Baill.

Status: VU D2

Threats: Collection, agriculture

Distribution: Rusitu Valley

Site: Haroni-Makurupini-Rusitu

Habitat: Moist forest

Climber.

IRIDACEAE

Hesperantha ballii Wild

Status: VU D2

Endemism: Endemic

Distribution: Chimanimani

Site: Point 71, Binga

Habitat: Grassland—Quartzite

Only two specimens collected (1961). Known from a high altitude.

LAMIACEAE

Leucas hephaestis (Wild) Sebal

Lasiacorys hephaestis Wild

Status: VU D2

Endemism: Endemic

Distribution: Great Dyke (N)

Site: Mavuradonha Mountains

Habitat: Grassland—Serpentine

Known only from the type.

LAURACEAE

Ocotea kenyensis (Chiov.) Robyns & R.Wilczek

Status: CR B1B2cD2

Threats: Habitat degradation, afforestation

Distribution: Chimanimani

Site: Chipinge

Habitat: Moist forest

Mutemo Communal Land. Found in small habitats.

Reported to have been observed in 1982 towards

Chipinge. Protected by local people. Decimated by

forestry plantations. Needs small gaps to regenerate.

Well-represented outside Zimbabwe: DRC, Ethiopia,

Kenya.

LEGUMINOSAE: CAESALPINIOIDEAE

Cassia afrofitula Brenan

Status: CR D

Threats: Agriculture

Distribution: Limpopo/Save Lowveld

Site: Mahenye area

Habitat: Dry woodland

In Kirkio woodland. Only one individual known. Habitat threatened by cultivation.

Schotia capitata Bolle

Status: CR D

Distribution: Limpopo/Save Lowveld

Site: North of the railway line Gonarezhou National

Park

Habitat: Dry woodland

Woodland, on sand. A small tree. Widespread. No known threat.

LEGUMINOSAE: MIMOSOIDEAE

Acacia adenocalyx Brenan & Exell

Status: CR D

Threats: Habitat degradation

Distribution: NE Lowveld

Site: Chibutsu hill

Habitat: Dry forest

Both known localities are on the same hill. Habitat restricted to gullies. May also occur elsewhere in the area, although known from very few individuals.

Acacia exuvialis I.Verdc.

Status: VU D2

Threats: Browsing

Distribution: Limpopo/Save Lowveld

Site: Near Chikombedzi- Gonarezhou National Park

Habitat: Dry woodland

Confined to Cretaceous sandstone.

Acacia hebeclada DC. subsp. chobiensis (O.B.Mill.)

A.Schreib.

Status: VU D2

Threats: Browsing

Distribution: NW Zimbabwe

Site: Victoria Falls, Kazungula

Habitat: Dry woodland

Some localities in a protected area. Probably under 250 mature individuals. Major threat comes from elephants. Population spreading along Zombezi River.

Acacia permixta Burt Davy

Status: VU D2

Distribution: Limpopo/Save Lowveld

Site: Fort of Tuli

Habitat: Dry woodland

One subpopulation confirmed. No known threats.

LOBELIACEAE

Lobelia lobata E.Wimm.

Status: VU D2

Endemism: Endemic

Distribution: Limpopo Escarpment—Matopos

Site: Farm Besno Kobila in Matobo District

Habitat: Grassland

It is apparently not known from outside Matopos.

Known from rocky areas, under overhanging rocks in

moist places. All collections from Farm Besno Kobila.

Grows under overhanging rocks in moist and rocky places.

Lobelia stricklandae Gilliland

Status: VU A1a

Endemism: Endemic

Threats: Afforestation

Distribution: Eastern Highlands

Site: Vumba Mountains, Belmont Forest, Penhalonga in

Nyanga, Ziway Forest

Habitat: Moist forest

Most sites were revisited in 1995, but no plants could be found. The major threat to this species in Zimbabwe is loss of habitats. The habitat is under Eucalyptus plantations.

LOGANIACEAE

Strynchos angolensis Gilg

Status: VU D2

Distribution: Eastern Highlands

Site: Pungwe Gorge, Burma Valley

Habitat: Moist forest

Low altitude, outliers with an area of 2–5 ha each. Not under threat. This species is sometimes placed in the family Strynchnoaceae.

Strychnos mellodora S.Moore
Status: VU D2
 Threats: Forestry exploitation
 Distribution: Chirinda
 Site: Chirinda Forest
 Habitat: Moist forest
Locally common. Also known from Mozambique, Kenya and Tanzania.

Strychnos mitis S.Moore
Status: VU D2
 Threats: Habitat degradation
 Distribution: Chirinda, Limpopo Escarpment
 Site: Chirinda Forest, Bikita, Wedza
 Habitat: Moist forest
Also known from Molawi, Uganda and other countries. Known only from moist or kloof forest.

MALPIGHIACEAE

Acridocarpus natalitius A.Juss.
Status: CR B1B2abcD
 Threats: Habitat degradation, grazing
 Distribution: Limpopo Escarpment—Chippinge
 Site: Chippinge
 Habitat: Dry woodland
Found in one location in precarious habitat. It is a twining climber. Habitat is extremely limited in Zimbabwe.

MELASTOMATACEAE

Warneckea sansibarica (Taub.) Jacq.-Fél. subsp. **buchanani** (Gilg) Borhidi
Status: CR B1B2cD
 Threats: Collection
 Distribution: Rusitu Valley
 Site: Haroni-Makurupini
 Habitat: Moist forest
A rare plant in Zimbabwe. Is a lowland forest species. Severely restricted. Probably fairly stable.

MELIACEAE

Lovoa swynnertonii Baker f.
Status: VU D2
 Endemism: Endemic
 Distribution: Chirinda
 Site: Chirinda forest
 Habitat: Moist forest
Only one locality. Not rare. Some distribution as Gardenia posoqueriodes.

MENISPERMACEAE

Dioscoreophyllum cumminsii (Stapf) Diels var. **leptotrichos** Troupin
Status: VU D1D2
 Distribution: Chirinda
 Site: Chirinda forest
 Habitat: Moist forest
Uncommon in Chirinda Forest.

MESEMBRYANTHEMACEAE

Delosperma steytlerae L.Bolus
Status: VU B1B2c
 Endemism: Endemic
 Distribution: Nyanga, Limpopo Escarpment
 Site: Acropolis of the Zimbabwe Ruins, Bonda Mission, World's View, Masvingo
 Habitat: Rocky
Some of the plants are in rural areas. Grows on granite hills. Numbers not known. No real threats, as it is not a collector's item. No evidence that there is a decline, but this may occur in future.

MORACEAE

Ficus bubu Warb.
Status: CR D
 Threats: Collection
 Distribution: Rusitu Valley
 Site: Haroni-Makurupini
 Habitat: Moist woodland
Widely distributed fig tree, but always found singly.

Ficus fischeri Warb. ex Mildbr. & Burret
Status: CR D
 Distribution: Chirinda
 Site: South of Chirinda forest, Sabi
 Habitat: Moist woodland
Just one tree from one locality. Also in DRC and Tanzania.

Ficus ottoniifolia (Miq.) Miq. subsp. **ulugurensis** (Mildbr. & Burret) C.C.Berg

Ficus modesta F.White
Status: CR D
 Threats: Agriculture
 Distribution: Nyanga
 Habitat: Moist forest
Recorded on one place, Eastern Highlands Tea Estate, along the stream. It occurs in a very small area. About five mature trees exist there.

Ficus scassellatii Pamp.
Status: VU D2
 Distribution: Chirinda
 Habitat: Moist forest
This species grows in mid-altitude semi-evergreen forest (1,900–1,950 m). It has a wide distribution, occurring in Tanzania, Kenya, Uganda, and the eastern part of DRC. It is a tall stronger fig, recorded as growing up to heights of 50 m.

Ficus vallis-choudae Delile
Status: EN B1B2cD
 Threats: Agriculture, habitat degradation
 Distribution: Rusitu Valley
 Site: Haroni-Rusitu
 Habitat: Moist forest
Strictly riverine, widely spread along a 10 km riverine fringe. Habitat is surrounded by agricultural fields.

Milicia excelsa (Welw.) C.C.Berg
Status: EN B1B2bce D
 Threats: Habitat degradation, agriculture
 Distribution: Rusitu Valley, Limpopo/Save Lowveld
 Site: Haroni-Rusitu, Makurupini, Gonarezhou, along the Runde
 Habitat: Moist forest
This tree can grow up to 20–50 m tall. It is a widespread tropical African genus. Heavily utilised as a timber species; commonly called 'eroco'.

Morus mesozygia Stapf ex A.Chev.
Status: CR D
 Threats: Agriculture
 Distribution: Rusitu Valley
 Site: Haroni-Rusitu (Westbank)
 Habitat: Moist forest
Area subject to human exploitation. One individual observed. Highly desirable timber species.

Streblus usambarensis (Engl.) Berg
Status: CR D
 Threats: Agriculture
 Distribution: Rusitu Valley
 Site: Haroni
 Habitat: Moist forest
Only a single juvenile was recorded from Haroni recently. This is the only record of the species in Zimbabwe. The species is not very well-represented outside Zimbabwe.

OCHNACEAE

Ochna afzeloides N.Robson
Status: CR D
 Distribution: Zambezi Lowveld
 Site: West of Sengwa Wildlife Research Station
 Habitat: Dry forest
Distribution the same as for Rytigina umbellata. Also in Tanzania and DRC.

ORCHIDACEAE

Aerangis kotschyana (Rchb.f.) Schltr.
Status: EN B1B2ceC1
 Distribution: Zambezi Lowveld, Rusitu Valley
 Site: Zambezi Valley 32 km southeast of Kariba, Rusitu
 Nyahodi Valley in Chimanimani
 Habitat: Moist forest; epiphyte
An epiphytic orchid in woodland and forest beside rivers and lakes, in low altitude rain forest and in coastal forest, often on trunks and lower branches of large, old trees. Two isolated subpopulations. The Zambezi subpopulation is probably extinct. Also occurs in Tropical Africa.

Aerangis rusituensis Fiebeck & Dare
Aerangis verdickii (De Wild.) Schltr. var. *rusituensis* (Fiebeck & Dare) la Croix & P.J.Cribb
Status: CR C2b
 Endemism: Endemic
 Threats: Collection, agriculture
 Distribution: Rusitu Valley
 Site: Chimanimani, Rusitu
 Habitat: Moist woodland; epiphyte
Occurs at an altitude of 300–800 m in a tropical lowland locality. It is a collector's item, since it is easy to cultivate. Mixed deciduous woodland. The taxonomy of this plant is disputed.

Aeranthus africana J.Stewart
Status: EN B1B2cd
 Endemism: Endemic
 Threats: Collection
 Distribution: Vumba
 Site: Castle Beacon, Vumba Mountains
 Habitat: Moist forest; epiphyte
This is a polioeendemic first described in 1978. The Vumba subpopulation might be depleted. It grows in a montane mist belt. It has no horticultural value, but it may be a local collector's item. It is very specific to Podocarpus latifolia.

Aeranthus parkesii G.Will.
Status: CR B1B2cdC1
 Endemism: Endemic
 Threats: Agriculture
 Distribution: Nyanga
 Site: Honde Valley, Inyangani Mountain (eastern slopes), Aberfoyle Tea Estate
 Habitat: Moist forest; epiphyte
A polioeendemic; small subpopulations. Known from only one locality in the Honde Valley, although this species may have been overlooked. This is a high rainfall area, which is heavily populated by people. There are fewer than 250 mature individuals. Habitat is threatened.

Angraecopsis trifurca (Rchb.f.) Schltr.
Status: EX?
 Distribution: Rusitu Valley
 Site: Nyahode Valley
 Habitat: Moist forest; epiphyte
Mother colony is in Comores (± 2,000 km from Zimbabwe). It is a polioeendemic, an epiphytic or lithophytic orchid. This species has probably been overlooked. Occurs in evergreen rain forest and mossy rocks in shade. This species was last collected in 1951.

Angraecum chimanimaniense G.Will.
Status: EN B1B2d
 Endemism: Endemic
 Distribution: Eastern Highlands

Site: Chimanimani, Vumba, Stapleford
Habitat: Moist forest; epiphyte
Epiphytic or lithophytic in riverine forest. Rare and small subpopulations. Palaeoendemic. Difficult to cultivate and flowers last only two days. Attractive plant with succulent leaves. High altitude and high rainfall.

Angraecum stella-africae P.J.Cribb
Status: EX?

Habitat: Moist forest; epiphyte
Known from only one or two collections in each country. This species has probably been overlooked. Closely related to *Angraecum chimanimaniense*. Seems to be extinct in Zimbabwe, where it is said to have been collected once and not been found again after several attempts.

Bulbophyllum ballii P.J.Cribb
Status: VU D2

Endemism: Endemic?
Threats: Habitat degradation
Distribution: Eastern Highlands
Site: Vumba, Rusitu
Habitat: Moist forest; epiphyte
Described in 1978. Fewer than 10 localities. Restricted distribution. Could be a palaeoendemic. Restricted areas smaller than 500 km². No horticultural potential. Riverine forest is a sensitive habitat, for example, in Rusitu. May also occur in Zambia.

Centrostigma occultans (Welw. ex Rchb.f.) Schltr.
Status: EN B1B2cC2b

Threats: Habitat degradation
Distribution: Central Watershed
Site: Borrowdale in Harare, Nyanga
Habitat: Damba
A rare orchid. Only one habitat in Zimbabwe intact, north of Harare (an private property). Many surveys have failed to find this species. There is a historical record for it in Pungwe (1931), but it was never refound there. This species needs a wet habitat.

Chaseella pseudohydra Summerh.
Status: EN B1B2c

Threats: Agriculture
Distribution: Nyanga, Rusitu Valley
Site: Honde Gorge, Mutare, Honde Valley, Haroni Gorge
Habitat: Moist forest; epiphyte
In Hande, the habitat is threatened due to agriculture, numerous searches for it was negative. Haroni Gorge subpopulation is safe. Also in Kenya (2,000 km away), but this has not been confirmed because it did not flower. Is in cultivation. A rare epiphyte.

Diaphanthe fragrantissima (Rchb.f.) Schltr.
Status: CR C2b

Distribution: Rusitu Valley
Site: Rusitu
Habitat: Moist forest; epiphyte
Riverine forest. Widespread in Africa. It is a large plant.

Diaphanthe kamerunensis Schltr.
Status: CR C2a

Threats: Collection
Habitat: Moist woodland
Riverine and unlikely to be built up; hence area is safe. Single subpopulation known.

Eulophia sp. Wild 3991
Status: VU D2

Endemism: Endemic
Threats: Mining
Distribution: Great Dyke (N)
Site: Mutarashanga
Habitat: Grassland—Serpentine
Number of plants unknown. Fairly conspicuous. It is a distinct species. The Wild specimen is unsuitable for a description, but the area has been surveyed three times and a similar looking plant has never been found again. Known only from the type specimen.

Eulophia hereroensis Schltr.
Status: VU D2

Threats: Urban expansion, habitat degradation
Distribution: Central Watershed
Site: Bulawayo, Harare, Mutare
Habitat: Moist woodland-Rocky
The Harare subpopulation is threatened by sewerage works. Harare subpopulation is the largest with about 1,000 mature individuals and occupies about 2–3 km². Other two subpopulations not well-known.

Eulophia walleri Kraenzl.
Status: CR C2bD

Distribution: Northwestern Zimbabwe
Site: Kazuma Pan Hwange National Park
Habitat: Dry woodland
In Zimbabwe it occurs only on Kalahari sand. Only one site, inside a National Park in Zimbabwe. Tropical Africa.

Habenaria unguilabris B.R.Adams
Status: CR B1B2cC1

Endemism: Endemic
Threats: Agriculture, habitat degradation
Distribution: Central Watershed (N)
Site: South of Chenanga Camp, near Southern boundary of Doma Safari Area, Makonde District
Habitat: Moist woodland
Often found in clearings in *Brachystegia boehmii* woodland on shallow, sandy soil. Habitat is desirable for agriculture, threatened. Only one collection in 1959. Not well-surveyed.

Neobolusia ciliata Summerh.

Status: VU D2
Endemism: Near-endemic
Threats: Agriculture
Distribution: Eastern Highlands
Site: Rusape, Chimanimani
Habitat: Grassland
Granite. High grassy plateau in montane grassland. Locality sensitive in Rusape to human impacts since it is a grassland in a rural area.

Neobolusia stolzii Schltr. var. glabripetala Summerh.

Status: VU D1D2
Endemism: Endemic
Threats: Afforestation, alien plant infestation
Distribution: Nyanga
Site: Foot of Mount Inyangani (Nyanga Downs, rock edge near Pungwe Falls, near Nyangombe River), Pungwe Gorge
Habitat: Grassland
Damp montane grassland amongst rocks on seepage slopes. Altitude of 1,800–2,300 m. Endemic to the foot of Mount Inyangani. The Pungwe Gorge subpopulation was found in February 2000. Habitat threatened by wattle and pines.

Oeceoclades decaryana (H.Perrier) Garay & P.Taylor

Status: EX?
Threats: Habitat degradation
Distribution: Chimanimani
Site: Umvumvuvu River
Habitat: Moist forest
Riverine forest in rocky areas, under bushes on rock outcrops. Also in coastal forest. Destroyed by construction, search and rescued in the 1990s, now in cultivation. Habitat destroyed by Cyclone Elina in March 2000. Said to be extinct in Zimbabwe.

Oeceoclades quadriloba (Schltr.) Garay & P.Taylor
Status: CR A2c

Threats: Damming
Distribution: Limpopo/Save Lowveld
Site: Tokwe-Mukosi dam area, Nyoni Hills
Habitat: Moist forest
In shade and riverine gully forest. Relicts. Up to a few hundred plants. The locality will be flooded when the Tokwe-Mukosi Dam is finished. Also recorded in Madagascar.

Oligophyton drummondii H.P.Linder & G.Will.
Status: VU D2

Endemism: Endemic
Distribution: Chimanimani
Site: Chimanimani
Habitat: Grassland—Quartzite
Montane zone, in sandy, quartzitic soil. Possibly overlooked. Very restricted. About 2,000 m altitude.

Platycoryne affinis Summerh.
Status: VU A2cC2

Endemism: Endemic
Threats: Desiccation
Distribution: Central Watershed
Site: Besna Kobilá (Matopos), Dunedin Farm (Rusape), a stream in Beatrice, Umwinsdale Road, Harare (Rumari Vlei, Prince Edward Dam Vlei, Chakamo Vlei, Ruwa River), Chipinge (Green Valley), Diggelofeld (Marandera)
Habitat: Damba
Dambas, a threatened habitat as a result of desiccation. Widespread in Zimbabwe, but never in abundance. Sporadic distribution of small subpopulations. Can be confused with *Platycoryne protearum*.

Polystachya golungensis Rchb.f.
Status: CR C2b

Distribution: Rusitu Valley
Site: Rusitu Valley, Burma Valley
Habitat: Moist forest
Widespread in Africa. It is a large plant.

Polystachya lindblomii Schltr.

Status: CR D
Distribution: Chimanimani
Site: Pungwe Falls (2 km below falls)
Habitat: Moist forest

Polystachya pubescens (Lindl.) Rchb.f.
Status: EX?

Distribution: Nyanga
Site: Hande
Habitat: Moist forest; epiphyte
Fringe subpopulation recorded in Hande (1971), but has never been rediscovered during surveys at that locality. Reported to be known also from South Africa. Could be extinct in Zimbabwe.

Polystachya subumbellata P.J.Cribb & Podzorski
Status: VU D2

Endemism: Near-endemic
Distribution: Eastern Highlands
Site: Vumba eastern end of Engwa farm, Chimanimani, Banti Forest
Habitat: Moist forest; epiphyte
Montane evergreen forest, at 1,200 m. Self-pollinating. Often flowers do not open, but may open at night.

Satyrium flavum la Croix
Status: VU D2

Endemism: Near-endemic
Distribution: Eastern Highlands
Site: Mount Peza, Nyanga
Habitat: Grassland
Montane grassland. Altitude of 2,000 m. Described in 1993. Number of plants unknown.

Satyrium mirum Summerh.
Status: VU D2

Endemism: Endemic
Threats: Afforestation
Distribution: Chimanimani
Site: Tank Nek (between Cashel—Chimanimani), Himalaya Range, Fandara in Cashel (Chimanimani)
Habitat: Grassland—Quartzite
In moorland grassland along a ridge. Described in 1996 at 1,800 m. Known only from the type collection. Land is mainly owned by Forestry Commission. Threat from forestry especially pine plantations. Area is not easily accessible.

Schizochilus cecilii Rolfe subs. cecilii
Status: VU D2

Endemism: Endemic

Distribution: Nyanga
Site: Inyanga Fort
Habitat: Grassland
Shallow soils in mountain grassland above 1,500 m.

Stolzia compacta* P.J.Cribb subsp. *purpurata

P.J.Cribb

Status: VU D2

Endemism: Near-endemic

Distribution: Eastern Highlands

Site: Himalaya Range

Habitat: Moist forest

Associated with Padacarpus latifolius. Inconspicuous plant. No horticultural value. Inaccessible habitat safe.

***Tridactyle bicaudata* (Lindl.) Schltr.**

Status: EN B1B2c

Threats: Agriculture

Distribution: Central Watershed, Rusitu Valley

Site: Mazvikadei dam, Miami, Haroni valley

Habitat: Moist woodland; epiphyte

*Found on hilltops and hill miomba, in Brachystegia woodland. Habitat not easily accessible. Commercial agriculture is a threat. The species *T. latifolia* sensu Ball was sunk under *T. bicaudata* (Lindl.) Schltr. from West Africa.*

***Tridactyle trimikeorum* Dare**

Status: VU D2

Endemism: Endemic

Threats: Habitat degradation

Distribution: Chimanimani, Limpopo Escarpment

Site: Chimanimani, Limpopo-Escarpment—Bukwa

Habitat: Moist woodland

Bukwa subpopulation is healthy, Chimonimani population nat. Unusual distribution. Last collected in 1998.

***Vanilla polylepis* Summerh.**

Status: EN D

Threats: Collection

Distribution: Eastern Highlands

Site: Vumba, Chimanimani (Bundi Gorge)

Habitat: Moist forest

Generally old over Africa. Very scattered and erratic distribution. Healthy subpopulations are fragmented. A climber and not utilised.

PASSIFLORACEAE

Adenia fruticosa* Burt Davy subsp. *simplicifolia

W.J.de Wilde

Status: VU D1

Distribution: Limpopo/Save Lowveld, Limpopo Escarpment

Site: Between Mutare, Birchenough and Mwenezi

Habitat: Dry woodland

Found in about ten habitats. Plants are scattered in their distribution. Also recorded in South Africa.

***Adenia spinosa* Burt Davy**

Status: VU D1

Distribution: Limpopo/Save Lowveld

Site: Between Beitbridge and Tuli/Shashi rivers, near

Limpopo River, along Umzimwane River and other

smaller rivers in Gwanda District

Habitat: Rocky

PERIPLOCACEAE

***Periploca nigrescens* (Afzel.) Bullock**

Parquetina nigrescens (Afzel.) Bullock

Status: CR D

Threats: Habitat degradation

Distribution: Limpopo/Save Lowveld

Site: Runde River, Gonarezhou National Park

A lion. Only known from a dying locality. Also in West Africa. Only one plant seen.

PHORMIACEAE

***Dianella ensifolia* (L.) DC.**

Status: VU D2

Threats: Collection

Distribution: Rusitu Valley

Site: Haroni-Makurupini

Habitat: Moist forest

Also recorded in Madagascar.

POACEAE

***Oreobambos buchwaldii* K.Schum.**

Status: EN C2a

Threats: Mining

Distribution: Limpopo Escarpment—Buchwa

Site: Bukwa Mountain

Habitat: Moist woodland

Significant number of plants destroyed in mining operation.

POLYPODIACEAE

***Platyserium alcorni* Desv.**

Status: EX

Threats: Collection, agriculture

Distribution: Rusitu Valley

Site: Pungwe River, Haroni forest

Habitat: Moist forest

Could not be found there again.

PROTEACEAE

***Protea neocrinita* Beard**

Status: VU D2

Endemism: Endemic?

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Very restricted in Chimonimani. Further investigation is needed. Possibly not endemic to Chimonimani and may occur in Molawi and Mozambique.

PTERIDACEAE

***Acrostichum aureum* L.**

Status: CR B1B2abcdC2b

Threats: Habitat degradation

Distribution: Limpopo/Save Lowveld

Site: Chisekele Reserve (Chiredzi Springs)

Habitat: Wetland

Only one subpopulation in Zimbabwe at Chisekele Reserve. Speculated that it is a relict. A coastal or mangrove coastal swamp species. Now found alongside the springs. A specially protected mangrove fern in Zimbabwe. Reserve close to rural settlement. Well-represented outside Zimbabwe.

***Aleuritopteris welwitschii* (Baker) Ching**

Status: EN A2cC2aD1

Threats: Grazing

Distribution: Central Watershed

Site: Ngomokurira

Habitat: Rocky

*Pressure is the same as for *Selaginella purpusilla*. High human population density is a threat. Also in various southern African countries.*

***Pellaea angulosa* (Bory ex Willd.) Baker**

Status: VU D2

Threats: Afforestation

Distribution: Chimanimani

Site: Mount Peni

Area owned by forestry companies. Pine plantations a threat. In various southern African countries and Madagascar.

RUBIACEAE

***Canthium ngonii* Bridson**

Status: VU B1B2dD

Endemism: Near-endemic

Distribution: Rusitu Valley, Chimanimani

Site: Makurupini, Burma Valley

Habitat: Moist woodland

Low altitude forest outliers. Ecotonal species. Very little habitat.

***Chasalia parvifolia* K.Schum. var. *Bridson* ined.**

Status: VU D1D2

Distribution: Chimanimani

Site: Makurupini Forest

Habitat: Moist forest

On the back of Chimanimani, close to the Mozambique side. Localised in distribution and rare. Also known from Malawi and Mozambique.

***Coffea ligustroides* S.Moore**

Status: VU D2

Endemism: Endemic

Distribution: Chirinda

Site: Chirinda forest

Habitat: Moist forest

Fairly common in Chirinda forest.

Coffea mufindiensis* Bridson var. *australis

Status: VU D2

Endemism: Near-endemic

Distribution: Vumba

Site: Bunga Forest Reserve

Habitat: Moist forest

Limited distribution extending into Molawi and Mozambique.

***Coffea zanguebariae* Lour.**

Status: EN D

Endemism: Near-endemic

Threats: Habitat degradation

Distribution: Zambezi Lowveld

Site: Rusape River mouth near Zambezi

Habitat: Dry forest

Threatened by people living there. Difficult to find.

***Gardenia imperialis* K.Schum.**

Status: CR D

Threats: Agriculture

Distribution: Vumba

Site: Zimbabwe/Mozambique border

Habitat: Moist forest

Known from one locality in lowland riparian forest at the Mozambique border. Found on a commercial form. Extremely widespread throughout Africa.

Gardenia posoquerioides* S.Moore subsp. *imperialis

Status: VU D2

Distribution: Chirinda

Site: Chirinda forest, Chipinge

Habitat: Moist forest

Not very common but not rare either, not highly threatened. Also recorded in Kenya and elsewhere.

Multidentia exserta* Bridson subsp. *exserta

Status: VU B1B2cD2

Distribution: Chirinda, Nyanga

Site: Inyangani, south of Chirinda forest

Habitat: Moist forest

On the lower slopes of Inyangani. The other locality is south of forest. Is an ecotonal species between the woodland and forest edge.

***Pavetta mulleri* Bridson**

Status: VU D2

Endemism: Endemic

Distribution: Nyanga?

Site: Sengwa Gorge

No known threat. Altitude: 1,300–1,500 m.

***Psydrax obovata* (Eckl. & Zeyh.) Bridson subsp.**

***elliptica* Bridson**

Status: VU D2

Distribution: Eastern Highlands
 Site: Mutare, Watsomba
 Habitat: Moist forest
 Possibly also from Gonarezhou National Park.

***Pyrostria bibracteata* (Baker) Cavaco**
Status: VU B1B2cD2
 Threats: Collection
 Distribution: Rusitu Valley
 Site: Haroni-Makurupini
 Habitat: Moist forest
Ecotonal species.

***Rytigynia umbellulata* (Hiern) Robyns**
Status: CR D
 Threats: Argiculture
 Distribution: Rusitu Valley
 Site: Makurupini forest
 Habitat: Moist forest

***Tricalysia accocantheroides* K.Schum.**
Status: VU D2
 Distribution: Eastern Highlands
 Site: Stapleford (at the top)
 Habitat: Moist forest
Area inaccessible and therefore safe.

RUTACEAE

***Vepris drummondii* Mendonça**
Status: VU D2
 Endemism: Near-endemic?
 Distribution: Eastern Highlands, Rusitu Valley
 Site: Mount Pene, Glencoe Forest Reserve, Haroni-Makurupini Forest along Makurupini River, Haroni—Timbiri River confluence, above hydra-dam on bank of Chambuka River in Tarka Forest Reserve, Mermaids Grotto, near Mubangazi River
 Habitat: Moist forest
Nat very common. Is a small shrub. Possibly in Mozambique.

***Zanthoxylum davyi* (I.Verd.) P.G.Waterman**
Status: EN D
 Distribution: Eastern Highlands
 Site: Mutare, Banti forest
 Habitat: Moist forest
Only seen twice. One subpopulation is safe and the other is threatened. Also known from South Africa and elsewhere.

***Zanthoxylum gillettii* (De Wild.) P.G.Waterman**
Status: VU D2
 Distribution: Chirinda
 Site: Chirinda forest
 Habitat: Moist forest
Uncertain in Chirinda.

SAPINDACEAE

***Allophylus chaunostachys* Gilg**
Status: VU D2
 Distribution: Chimanimani, Rusitu Valley
 Site: Tarka, Rusitu forests
 Habitat: Moist forest
Also found in South Africa and elsewhere.

***Allophylus chirindensis* Baker f.**
Status: VU B1B2cD2
 Endemism: Endemic?
 Threats: Habitat degradation
 Distribution: Eastern Highlands
 Site: Chirinda forest, Vumba, Burma Valley
 Habitat: Moist forest
Possibly also in Mozambique. Medium altitude evergreen forest. Infrequent, outliers are vulnerable.

***Erythrophysa transvaalensis* I.Verd.**
Status: VU D2
 Distribution: Central Watershed, Limpopo Escarpment
 Site: Bulawayo, Gwanda
 Habitat: Dry woodland

Habitat not in a protected area though it is not in any danger of extinction. The species is not collected at all.

***Pancovia golungensis* (Hiern) Exell & Mendonça**
Status: CR D
 Distribution: Eastern Highlands, Rusitu Valley
 Site: Burma Valley, Rusitu
 Habitat: Moist forest

SAPOTACEAE

***Chrysophyllum viridifolium* J.M.Wood & Franks**
Status: VU D2
 Distribution: Chirinda
 Site: Chirinda forest
 Habitat: Moist forest
Not very common. Scattered trees.

***Manilkara concolor* (Harv. ex C.H.Wright) Gerstner**
Status: VU D1D2
 Distribution: Limpopo/Save Lowveld
 Site: South of Lundi Gonarezhou National Park
 Habitat: Dry woodland
Dry river beds, scattered on river sand and alluvium. Widespread in the area. Danger from elephants not a problem at the moment. Habitat specialised, but its potential habitat is large.

***Synsepalum kaessneri* (Engl.) Pennington**
Status: VU D2
 Threats: Collection
 Distribution: Rusitu Valley
 Site: Haroni-Makurupini
 Habitat: Moist forest
Fairly common.

SCROPHULARIACEAE

***Buchnera granitica* S.Moore**
Status: VU D2
 Endemism: Endemic
 Distribution: Central Watershed
 Site: Harare
 Habitat: Moist woodland
Occurs on granite soils; known only from type specimen.

***Hebenstretia oatesii* Rolfe subsp. *inyangana* Roessler**
Status: VU D2
 Endemism: Endemic
 Distribution: Nyanga
 Site: Mount Inyangani summit ridge
 Habitat: Grassland
High montane grasslands.

***Jamesbrittenia zambeziaca* (R.E.Fr.) Hilliard**
Status: CR B1B2c
 Endemism: Endemic
 Distribution: NW Zimbabwe
 Site: Victoria Falls
 Habitat: Rocky
Known only from the type. Known from crevices of dry rock along the edge of the gorge same distance below Victoria Falls.

***Selago serpentina* Hilliard**
Status: VU B1B2cD2
 Endemism: Endemic
 Distribution: Great Dyke (S)
 Site: Ngesi; south of Selukwe; Mtlikwe (?) near Otto Mine
 Habitat: Grassland—Serpentine
Also found on a granitic hillack at Mtlikwe Communal Land.

SELAGINELLACEAE

***Selaginella perpusilla* Baker**
Status: VU D2
 Distribution: Limpopo/Save Lowveld

Site: Lundi River Bridge
 Habitat: Rocky
Widespread on granite. Area subject to much mist. Probably a remnant of a wider distribution. It is likely to be rare. Also recorded in East and Central Africa, Madagascar and DRC.

ULMACEAE

***Celtis mildbraedii* Engl.**
Status: VU D2
 Distribution: Chirinda
 Site: Chirinda forest
 Habitat: Moist forest
Very common in Chirinda, rare in other countries.

VERBENACEAE

***Clerodendron incisum* Klotzsch**
Status: CR B1B2cD
 Threats: Agriculture
 Distribution: Rusitu Valley
 Site: Haroni-Rusitu junction
 Habitat: Moist forest
Locality subjected to dramatic land-use change. It is suspected that this is the only locality. Only one individual seen in transition woodland-submontane grassland ecotone, at an altitude of 1,525–1,830 m. Possibly also occurs in northern Chimanimani.

VIOLACEAE

***Rinorea arborea* (Thouars) Baill.**
Status: CR B1B2bcD2b
 Threats: Habitat degradation, agriculture
 Distribution: Rusitu Valley
 Site: Rusitu forest
 Habitat: Moist forest
Dalerite specialist. Small forest tree. Not utilised. Historically a narrow distribution in Zimbabwe.

***Rinorea elliptica* (Oliv.) Kuntze**
Status: CR B1B2bcD
 Threats: Habitat degradation, soil erosion
 Distribution: Limpopo/Save Lowveld
 Site: Along Runde Gonarezhou National Park
 Habitat: Moist forest
Fewer than ten plants from one locality known; the locality is highly threatened as a result of river bank erosion. Elephants pose a threat.

***Rinorea ilicifolia* (Welw. ex Oliv.) Kuntze**
Status: CR D
 Threats: Collection
 Distribution: Rusitu Valley
 Site: Haroni-Makurupini
 Habitat: Moist forest
One of the rare plants in Haroni forest.

VITACEAE

***Cyphostemma masukuense* (Baker) Desc. ex Wild & R.B.Drumm.**
Status: VU D2
 Distribution: Chirinda, Rusitu Valley
 Site: Chirinda, Makurupini
 Habitat: Moist forest

VITTARIACEAE

***Vittaria elongata* Sw.**
Status: EN B1B2ac2a
 Threats: Collection
 Distribution: Rusitu Valley
 Site: Haroni
 Habitat: Moist forest
This is a coastal species which has been intensively collected. Locals collect plants, it is seriously threatened. Old World Tropics.

Vittaria ensiformis Sw.

Status: EN B1B2aC2a

Threats: Collection

Distribution: Rusitu Valley

Site: Haroni

Habitat: Moist forest

Same locality as *Vittaria elongata*, on the same trees but fewer numbers than *V. elongata*. Also recorded from Mauritius, southeast Asia, Australia and Tanzania.

ZAMIACEAE

Encephalartos chimanimaniensis R.A.Dyer & I.Verd.

Status: EX

Threats: Collection

Distribution: Chimanimani

Habitat: Grassland—Quartzite

Initially very rare and critically endangered. It was only known from a single site in the catchment of a river.

Recent field surveys have been unable to locate more individuals. The species appears to have been wiped out by collectors.

Encephalartos concinnus R.A.Dyer & I.Verd.

Status: EN A1acdB1B2cdC2a

Endemism: Endemic

Threats: Collection

Distribution: Limpopo Escarpment

Habitat: Dry woodland

Was said to be abundant and producing cones on north-facing slope of a known locality in 1968. Two colonies, with five individuals each, were recorded north of an important river. Highly threatened by collectors.

Encephalartos manikensis (Gilliland) Gilliland

Status: EN A1acdC2a

Threats: Afforestation, agriculture, collection

Distribution: Eastern Highlands

Habitat: Grassland

In 1995, 5,000 plants were estimated to exist in the wild. Several accounts of local extinctions are known. Threatened by collectors.



Quartzite ridges of the northern Chimanimani. (Photo: J. Timberlake)

LOWER RISK

ACANTHACEAE

Anisotes broctetotus Milne-Redh.

Status: LR-nt

Distribution: Widespread

Reported to have a wide distribution throughout Zimbabwe. No further information is available.

Borleria molensis Wild

Status: LR-lc

Endemism: Endemic

Distribution: Great Dyke (S)

Site: About 1 km north of Ngezi Dam at Lalapanzi turn-off, Mhlaba Hill in Chivu, Lalapanzi Chrome Mine in Chirimhanzu, Sebakwe National Park, Ngezi-Battlefields Road in Kadoma

Habitat: Grassland—Serpentine

Prefers low rainfall. Been collected several times. Grows in open deciduous bushland, stony slopes.

ALOEACEAE

Aloe inyongensis Christian

Status: LR-nt

Endemism: Endemic

Threats: Collection

Distribution: Eastern Highlands

Site: Escarpment summit between the Nyanga dawns, Inyangani mountains, Vumba (Castle Beacan), North of Nyanga village, Mtarazi Falls, between Nyanga and Mutare, Chimanimani

Habitat: Rocky

Widely distributed in the Nyanga area. Occurs in rocky areas where plants are protected from fire.

ANACARDIACEAE

Ozoroa longepetioloto R. & A.Fern.

Status: LR-lc

Endemism: Endemic

Threats: Mining

Distribution: Great Dyke (N)

Habitat: Grassland—Serpentine

Very common in the north. Has not been seen in the south. Land is not arable. Plant is extremely abundant.

Rhus lucens Hutch.

Status: LR-nt

Distribution: NW Zimbabwe

Site: Kariba Gorge, Victoria Falls, Matetsi area?

Habitat: Dry woodland

Dry forest/woodland. Few individuals were found at each location.

Rhus tenuipes R. & A.Fern.

Status: LR-lc

Endemism: Endemic

Distribution: Great Dyke (S)

Site: Shabane, Mashava

Habitat: Grassland—Serpentine

Found on same areas just around the Dyke. Thin-leaved species.

Rhus tomentosa L.

Status: LR-lc

Distribution: Nyanga

Site: Pungwe source

Habitat: Grassland

Above 1,800 m.

Rhus tumicola S.Moore

Status: LR-lc

Distribution: Eastern Highlands

Site: Chimanimani, Nyanga

Rare at both localities.

Rhus wildii R. & A.Fern.

Status: LR-lc

Endemism: Endemic

Distribution: Great Dyke (N)

Site: Mpinga Pass, Vanad Pass, Nyanyetsi Estate

Habitat: Grassland—Serpentine

Exposed chrome ridges. A rare dwarf shrub up to 1,2 m tall. There are five specimens in SRGH, three of which are from Vanad Pass.

ANNONACEAE

Artabotrys monteiroae Oliv.

Status: LR-lc

Distribution: Nyanga, Vumba

Site: Nyanga-Vumba forest

Habitat: Moist forest

In medium altitude forest areas.

Uvorio gracilipes N.Robson

Status: LR-nt

Threats: Browsing

Distribution: Limpopo/Save Lowveld

Site: Chilo rock cliff, Gonarezhou National Park

Habitat: Dry woodland

Dry forest thicket. Elephants damage the habitat.

Xylopio odorotissimo Oliv.

Status: LR-lc

Distribution: NW Zimbabwe

Site: Kazuma Pan

Habitat: Dry woodland

Kalahari sands. Scattered over a large area. Area formally protected.

APIACEAE

Centella obtriangularis Cannon

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Quartzite endemic. Widespread. Found on wet grassy slopes or banks.

APOCYNACEAE

Strophanthus nicholsonii Holmes

Status: LR-lc

Distribution: Widespread

Site: Hurungwe, Hwange, Nyanga (N)

Habitat: Dry woodland

Widespread.

Wrightio notolensis Stapf

Status: LR-lc

Distribution: Limpopo/Save Lowveld

Site: Save Valley, Ganarezhou National Park

Habitat: Dry woodland

ASCLEPIADACEAE

Brochystelma discoideum R.A.Dyer

Status: LR-nt

Distribution: Central Watershed

Site: Luveve Cemetery Raad, Gweru Teacher's College grounds, Glencurragh Farm in Nyamandlavu

In South Africa it is only known from a slate pan north of Pretaria.

Huernia procumbens (R.A.Dyer) L.C.Leach

Status: LR-lc

Distribution: Limpopo/Save Lowveld

Habitat: Dry woodland

Grows in Andrastachys habitots. Not in any danger.

Huernio volkartii Peitsch ex Werderm. & Peitsch
var. volkartii

Status: LR-lc

Distribution: Chimanimani, Limpopo Escarpment

Site: Kyle Dam, Buchwa Mountain, Chimanimani

Habitat: Moist woodland

Restricted distribution. Fairly safe from threats.

Huernio zebrina N.E.Br.

Status: LR-lc

Distribution: Limpopo/Save Lowveld

Site: Near Tuli along the Limpopo, up to the Nuanetsi

Gorge near Buffalo Bend

Habitat: Dry woodland

Very scattered distribution.

Pachycymbium keithii (R.A.Dyer) L.C.Leach

Status: LR-lc

Occurs in a wide range of habitats. Commonly

overlooked species.

Pachycymbium schweinfurthii (A.Berger)

M.G.Gilbert

Caralluma schweinfurthii (Berger)

Status: LR-lc

Distribution: NW Zimbabwe

Site: Lukasi River and upper Kariba Basin

Habitat: Dry woodland

Restricted distribution but certainly not threatened.

Raphionacme chimanimoniana Venter & R.L.Verh.

Status: LR-lc

Distribution: Chimanimani

Site: Musapa Gap area

Habitat: Grassland—Quartzite

Known from only two specimens from Chimanimani.

Probably moderately widespread. Also known from the Limpopo Province in South Africa. There could be more species of Raphionacme from Chimonimani.

Stapelia getliffei R.Pott

Status: LR-nt

Distribution: Limpopo/Save Lowveld

Site: Along the Save, Limpopo and Shashe Rivers

Habitat: Dry woodland

Occurs sporadically growing under bushes.

Stapelia kwebensis N.E.Br.

Status: LR-lc

Threats: Habitat degradation

Distribution: Limpopo/Save Lowveld

Site: Save Valley, around Nyanyadzi

Not threatened.

Trochoclymma graminifolius (Wild) Goyder

Pachycarpus graminifolius Wild

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Rocky places at an altitude of 2,400 m.

ASPLENIACEAE

Asplenium sebungweense J.E.Burrows

Status: LR-nt

Endemism: Near-endemic?

Threats: Mining

Distribution: Zambezi Lowveld

Site: Gakwe, Charama plateau, Busi River, Kove River Gorge

Habitat: Dry forest

Fairly limited distribution in Zambia and Zimbabwe

(about 100 km radius) but probably widespread. Coal mining is a threat. Found in Zambia, and also possibly in Angola and DRC.

ASTERACEAE

Anisopappus chinensis (L.) Hook.f. & Arn. subsp. *lobatus* (Wild.) Ortiz & Paiva

Anisopappus dentatus (DC.) Wild subsp. *lobatus* Wild

Status: LR-nt

Endemism: Endemic

Distribution: widespread

Site: Makoni

Common and widespread on granite hills. No additional information available.

Anisopappus chinensis (L.) Hook.f. & Arn. subsp. *paucidentatus* Ortiz & Paiva

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Quartzite endemic. Altitude higher than 1,500 m. Fairly widespread on the Chimonimonis.

Athrixia fontinalis Wild

Status: LR-lc

Endemism: Endemic

Distribution: Eastern Highlands

Site: Chimanimani, Nyanga

Habitat: Grassland

Shallow soil in montane grassland above 1,500 m.

Dicoma nicalifera De Wild.

Status: LR-lc

Endemism: Near-endemic

Distribution: Central Watershed, Great Dyke (N)

Site: Inyati, Shurugwi, Mutare, Ngezi Dam 1 km north of Lalapanzi turn-off, Murial Mine, Sengwa Game Reserve, Kingston Hill in Bindura, Umtebeka/Umtebekwanana rivers, Mpingi Pass, Shamva Road, Tipperary Claims, Mtarashanga Pass at foot of Ndumba Hill at Inyati, Hurungwe

Habitat: Grassland—Serpentine

Numerous localities. Mostly on serpentine soils with a high nickel value; also found on non-serpentine soils.

Helichrysium acervatum S.Moore

Status: LR-lc

Endemism: Endemic

Distribution: Eastern Highlands

Site: Nyanga Pungwe View Point in Nyanga, Mount Inyangani, Nyanga Troutbeck Circular Drive overlooking Pungwe Valley, Nyanga Mare Dam Road, Mount Peza, Nyanga Pungwe source, Mount Musapa in Chimanimani

Habitat: Grassland

Common in the Nyanga area.

Helichrysium chasei Wild

Status: LR-lc

Endemism: Endemic

Distribution: Eastern Highlands

Habitat: Grassland

Grassland habitat. Widespread but restricted to the Eastern Highlands.

Helichrysium granitocala Wild

Status: LR-nt

Endemism: Endemic?

Distribution: Central Watershed, Limpopo Escarpment—Matapos

Site: Matapos, Harare

Habitat: Rocky

Confined to granite hills. Not recorded outside Zimbabwe but unlikely to be an endemic. Extremely widespread.

Helichrysium rhodellum Wild

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Quartzite endemic. Apparently widespread in Chimanimani.

Helichrysium spencerianum Wild

Status: LR-nt

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Quartzite. Widespread.

Humea africana S.Moore

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Quartzite endemic. Fairly widespread and common on an altitude of about 1,700 m and higher.

Nidorella resedifolia DC. subsp. *serpentinicola* Wild

Status: LR-lc

Endemism: Endemic

Distribution: Great Dyke (N)

Site: Nora Mine in Mutorashanga, Vanad Pass near

Janwell Farm in Mvurwi Mountains

Habitat: Grassland—Serpentine

Vernania accamodata Wild

Status: LR-lc

Endemism: Endemic

Distribution: Great Dyke

Site: Mpingi Pass, Gath Mine, Windsar Chrome Mine,

Otta Mine, Kildanan, Rodcamp Mine, Mashava Mine

Habitat: Grassland—Serpentine

Grows spontaneously on chrysotile asbestos mine dumps. Scattered distribution.

Vernania bainesii Oliv. & Hiern subsp. *wildii* (Merxm.) Wild

Vernonia wildii Merxm.

Status: LR-lc

Endemism: Endemic

Distribution: Great Dyke (N), Central Watershed

Site: Vanad Pass, Rusape, Nyanga

Habitat: Moist woodland, grassland

Grassland, on granite or serpentine soils and also in miamba woodland.

Vernania eylesii S.Maare

Status: LR-lc

Endemism: Endemic

Distribution: Eastern Highlands, Limpopo Escarpment

Site: Chimanimani, Forest Hill Kap, Papoteke River

gorge, Rusape, Zimunya, Kyle

Habitat: Moist woodland

Granite hills and associated sandveld.

Vernania muelleri Wild subsp. *muelleri*

Status: LR-nt

Endemism: Near-endemic

Distribution: Chimanimani

Habitat: Moist woodland, Moist Forest

Occurs in evergreen forest and adjacent woodlands, at

an altitude of 500–1,250 m. Not endemic to quartzite.

Habitat is very restricted, but is more open and possibly disturbed. There may have been a possible change in population. It is an ecotonal species.

Vernania nepetifolia Wild

Vernonia gracilipes var. *minor* S.Moore

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Mount Peza and Mount Peni

Habitat: Grassland

Quartzites and sandstones. Common around 1,526 m.

Rocky slopes, on quartzite and an Umkanda sandstones.

BALSAMINACEAE

Impatiens salpinx Launert

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

In shade and watercourses. It is locally common.

BLECHNACEAE

Blechnum ivahibense C.Chr.

Status: LR-lc

Distribution: Eastern Highlands

Site: Nyanga, Mount Peni

Mozambique, Zimbabwe, Madagascar, Kenya, Tanzania.

BUDDLEJACEAE

Buddleja pulchella N.E.Br.

Status: LR-nt

Distribution: Central Watershed

Site: Diana's Vow, Mutare

Habitat: Moist woodland

Widespread. Only in higher rainfall areas on granite hills. Limited distribution range in foothills. Under a threat.

CELASTRACEAE

Maytenus heterophylla (Eckl. & Zeyh.) N.Rabsan subsp. *puberula* N.Rabsan

Gymnosporia matopensis M.Jordaan

Status: LR-lc

Endemism: Endemic

Distribution: Limpopo Escarpment-Matopos

Site: Matopos and Bulalima Mangwe districts

Habitat: Dry woodland

Occurs on granite in fringing forests. Endemic to

Matopos. Habitat wide. Common in the area; a substantial part of the population occurs in a protected area. Not utilised.

Maytenus axycarpa N.Rabsan

Status: LR-lc

Distribution: Limpopo/Save Lawveld

Site: Tswiza, Mwenezi

Habitat: Dry woodland

Has a narrow distribution, but also occurs in South

Africa. Habitat unspecific. No changes in its habitat.

Has a restricted distribution. Taxonomic status probably pending.

Maytenus pubescens N.Rabsan

Status: LR-lc

Distribution: Limpopo/Save Lawveld

Site: Rupisi, Malipati

Habitat: Dry woodland

Not a known threat.

CONVOLVULACEAE

Convolvulus ocellatus Hook.f. var. *placiternivus* Verdc.

Status: LR-lc

Endemism: Endemic

Distribution: Great Dyke (N)

Site: Where Mvurwi range cross Harare-Lusaka road,

Vanad Pass, Mtorashanga Pass, Ruorka Ranch, 15 km

south of Mhlaba Hills, Harseshae Mine, Vanad Pass,

Ngezi Battlefields Road on Grassland in Kadama,

Rodcamp Mine in Lamagundi

Habitat: Grassland—Serpentine

Open grassland. Very common.

***Merremia xanthophylla* Hall.f.**
Status: LR-lc
 Distribution: Central Watershed
 Site: Mount Darwin, Mhlaba hills, Mutare
 Habitat: Grassland

CRASSULACEAE

***Kalanchoe velutina* Welw. ex Britten subsp. *chimanimanensis* (R.Fern.) R.Fern.** 1
Kalanchoe chimanimanensis R.Fern.
Status: LR-nt
 Endemism: Endemic
 Distribution: Chimanimani
 Site: Chimanimani Mountains
 Habitat: Grassland—Quartzite
 Grows among rocks on slopes of mountains.

CUPRESSACEAE

***Widdringtonia nodiflora* (L.) Powrie**
Status: LR-lc
 Threats: Fire
 Distribution: Eastern Highlands
 Site: Inyanga, Chimanimani
 Habitat: Moist forest
 In its habitat, it is very common. Affected by fire/ utilised? But really is not threatened. Growth form makes it undesirable.

CYATHEACEAE

***Cyathea capensis* (L.f.) Sm.**
Status: LR-lc
 Distribution: Eastern Highlands
 Site: Meikles, Chizungu
 Habitat: Moist forest
 Very localised in Zimbabwe. Stoble forest edge habitats. Extremely common and well-represented throughout the southern and east African region.

***Cyathea dregei* Kunze**
Status: LR-nt
 Threats: Collection
 Distribution: Eastern Highlands, Limpopo Escarpment—Matopos
 Habitat: Grassland
 Not considered threatened in Zimbabwe.

***Cyathea manniana* Hook.**
Status: LR-nt
 Distribution: Nyanga, Vumba
 Habitat: Moist forest
 A tree fern.

ERICACEAE

***Erica lanceolifera* S.Moore**
Status: LR-lc
 Endemism: Endemic?
 Distribution: Chimanimani
 Site: Bundi River (Mountain Hut), Outward Bound School, foot of Sphinx Pass, Bundi Head Waterfalls, Nyamhanya River—Martin Forest Reserve, Greenmount Farm, Mount Peni, Tarka Forest Reserve, Kasipi, Tilbury Estate, Bridal Veil Falls
 Habitat: Grassland—Moist woodland
 May also occur in Tanzania but there is no concrete proof as the one specimen that was seen at Kew may not have come from Tanzania. Chimanimani endemic in montane grassland and woodland. It has a very wide distribution.

Erica pleiotricha* S.Moore var. *pleiotricha
Status: LR-nt
 Endemism: Endemic
 Distribution: Chimanimani
 Site: Chimanimani

Habitat: Grassland—Quartzite
Quartzite endemic. In damp places among rocks near the summit of mountains. Common on the summits.

***Erica pleiotricha* S.Moore var. *blaeriodes* (Wild) R.Ross**
Status: LR-nt
 Distribution: Chimanimani
 Site: Musapa
 Habitat: Grassland—Quartzite
 Frequently collected in Mozambique.

***Erica wildii* Brenan**
Status: LR-nt
 Endemism: Endemic
 Distribution: Chimanimani
 Site: Chimanimani
 Habitat: Grassland—Quartzite
Quartzite endemic. Widespread and common. In upland, sovoono and amongst rocks.

***Erica waadii* Bolus**
Status: LR-lc
 Endemism: Endemic
 Distribution: Eastern Highlands
 Site: Inyanga, Chimanimani
 Habitat: Grassland
 Found at high altitudes (> 1,900 m), and is common in Inyanga and Chimonimani in grassland and often by streams. Sporadic distribution.

ERIOCAULACEAE

***Mesanthemum africanum* Moldenke**
Status: LR-nt
 Endemism: Near-endemic
 Distribution: Chimanimani
 Site: Chimanimani
 Habitat: Grassland—Quartzite
 Altitude 1,200 m to the top of the mountain. Three citations in Flora zambesiaca.

ERIOSPERMACEAE

***Eriospermum phippsii* Wild**
Eriospermum mackenii (Hook.f.) Baker subsp. *phippsii* (Wild) Perry
Status: LR-nt
 Endemism: Endemic
 Distribution: Chimanimani
 Site: Upper Bundi plain, Musapa gap near Martin Forest Reserve, Chikukwa's Kraal near Mountain Forest Reserve, Club Hut
 Habitat: Grassland—Quartzite
Quartzite, grassland. Fairly widespread. Altitude higher than 1,700 m.

EUPHORBACEAE

***Alchornea hirtella* Benth.**
Status: LR-nt
 Distribution: Eastern Highlands
 Site: Chirinda, Nyanga, Makurupini
 Habitat: Moist forest
 Not under any threat. Habitat on steep slopes. Widespread geographically, throughout the more humid parts of Tropical Africa.

***Clusia punctata* Wild**
Status: LR-nt
 Endemism: Endemic
 Distribution: Chimanimani
 Site: Summit of "uncontoured peak", Mawenje slopes
 Habitat: Grassland—Quartzite
Quartzite endemic. Montane grassland among quartzite crags on rocky summits and steep slopes, therefore habitat restricted. Similar to Clusia abyssinica, but is completely glabrous.

***Euphorbia caeperi* N.E.Br. ex A.Berger var. *calidicola* L.C.Leach**
Status: LR-lc
 Distribution: Zambezi Lowveld
 Habitat: Dry woodland
 Known from Sebungwe, Hwange and the Zambezi River Valley.

***Euphorbia gossypina* Pax subsp. *mangulensis* S.Carter**
Status: LR-nt
 Endemism: Endemic
 Distribution: Central Watershed
 Site: Mhangura
 Not threatened. Known from northern Zimbabwe.

Euphorbia griseola* Pax subsp. *griseola
Status: LR-lc

***Euphorbia griseola* Pax subsp. *maschanica* L.C.Leach**
Status: LR-lc
 Distribution: Central Watershed
 Widespread in central and northern parts of Zimbabwe.

***Euphorbia guerichiana* Pax**
Status: LR-nt
 Distribution: Limpopo/Save Lowveld
 Fairly widespread but not common in southern and western Zimbabwe in scattered colonies.

Euphorbia malevala* L.C.Leach subsp. *malevala
Status: LR-lc
 Distribution: Widespread
 Widely distributed throughout Zimbabwe.

***Euphorbia persistentifolia* L.C.Leach**
Status: LR-lc
 Distribution: Zambezi Lowveld, Limpopo/Save Lowveld
 Site: Zambezi Valley

***Euphorbia schinzii* Pax**
Status: LR-lc
 Distribution: Central Watershed
 Site: Matopos, Bulawayo
 Habitat: Dry woodland
 Widely distributed throughout Zimbabwe. Several taxa have been given this blanket name.

***Euphorbia wildii* L.C.Leach**
Status: LR-nt
 Endemism: Endemic
 Threats: Collection, mining
 Distribution: Great Dyke (N)
 Site: Mutorashanga Pass, west of Kildanan, Ruorka Ranch, Umvukwes Mountains
 Habitat: Grassland—Serpentine
 Locally abundant. Risk from collectors not that serious, but sensitive to chrome mining. Regeneration is good.

***Phyllanthus serpentinicola* Radcl.-Sm.**
Status: LR-lc

Endemism: Endemic
 Distribution: Great Dyke (S)
 Site: Moodies Pass, 3 km south of Chivi Village, Hendrik's Pass
 Habitat: Grassland—Serpentine
 Serpentine soils on slopes, with chrome seams. Altitude 1,200 m. Very much like *Phyllanthus maderaspatensis* but is a suffrutescent with small (< 1.5 X 1 cm) obovate leaves. It is extremely abundant.

FLACOURTIACEAE

***Scopia staltzii* Gilg ex Sleumer**
Status: LR-nt
 Distribution: Eastern Highlands
 Site: Burma, Chirinda, Vumba, Nyanga
 Habitat: Moist forest
 In riverine forest. Medium altitude. A rare tree in forest patches.

GRAMMITIDACEAE

Cochlidium serrulatum (Sw.) L.E.Bishop

Status: LR-nt

Threats: Collection

Distribution: Rusitu Valley

Site: Haroni

Habitat: Moist forest

Grows on rocks in the river—looks like moss. Not well-protected. Near the Mozambican border. Part of the forest has disappeared. Also in Madagascor.

HIPPOCRATEACEAE

Hippocratea pallens Planch. ex Oliv.

Status: LR-nt

Threats: Collection, agriculture

Distribution: Chirinda, Rusitu Valley

Site: Haroni-Rusitu, Chirinda forest

Habitat: Moist forest

Fairly common in the two forests.

Hippocratea volkensii Loes.

Status: LR-ic

Distribution: Rusitu Valley, Zambezi Lowveld

Site: Haroni-Rusitu, Forest near Zambezi escarpment

Habitat: Moist forest

A forest climber.

LAMIACEAE

Hemizygia flabellifolia S.Moore

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Quartzite endemic. About 1,500 m altitude. Seems to be widespread and fairly common.

Hemizygia oritrephes Wild

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Mountains south of Mount Peza, Runde valley.

Bundi River, Summit of Peak above Haroni River, below

Mountain Hut, edge of Bundi River in Bundi Valley

Habitat: Grassland—Quartzite

Quartzite endemic. Common and widespread. Said to be locally common on mountains south of Mount Pezo.

Leucas aggerestris (Wild) Sebald

Status: LR-ic

Endemism: Endemic

Distribution: Great Dyke (N)

Site: Mpinga Pass, Nyamunyeche Estate, Mono Mine which is 12 km north of Mutorashanga, Mutorashanga, Rod Camp Mine, Caesars Pass, where Harare-Lusaka road crosses Mvurwi (Umvukwes) Range, Birkdale Pass

Habitat: Grassland—Serpentine

Scattered throughout northern Great Dyke. Several sites.

Plectranthus caudatus S.Moore

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani—Quartzite

Habitat: Rocky

Quartzite endemic, above 1,000 m. Widespread.

Plectranthus porphyranthus T.J.Edwards & N.Crouch

Status: LR-ic

Endemism: Endemic

Distribution: Limpopo Escarpment—Kyle, Matopos

Site: Richmond Farm, Harare Rd, 4 km from Masvingo;

10 km east of Kyle Dam; Matopos, Besa Kobila Farm.

Habitat: Moist forest

Found in xerophytic plant communities on granite lithosols, often in association with *Myrothamnus flabellifolia*, *Selaginella dregei* and *Crassula* species.

LEGUMINOSAE: CAESALPINIOIDEAE

Azelia quanzensis Welw.

Status: LR-ic

Threats: Forestry exploitation

Distribution: Widespread

Site: Lowveld, Bulawayo, Matopos, Gokwe

Habitat: Dry woodland

Below 600 m altitude. Very common tree in the lowveld.

Less common in Bulawayo. Desirable timber tree, used

by farmers and on commercial basis. Does not coppice.

Stays deciduous for a long time. Found in oroble and

non-oroble areas.

Baikiaea plurijuga Harms

Status: LR-nt

Threats: Forestry exploitation

Distribution: NW Zimbabwe

Habitat: Dry woodland

Grows in Kolohori sands. Very common in the area.

Coppices regularly. A desirable commercial timber.

Timber size has been exploited heavily in the past.

LEGUMINOSAE: MIMOSOIDEAE

Acacia chariessa Milne-Redh.

Status: LR-ic

Endemism: Endemic

Distribution: Central Watershed

Site: Mvuma to Bulawayo, Mashava Hills, Ngezi,

Mashava, Windsor Chrome Mine, Chivu

Habitat: Dry woodland

Widespread usually found on red, shallow soils at

altitudes greater than 1,000 m. Common on serpentine

soil but also on other soil types.

LEGUMINOSAE: PAPILIONOIDEAE

Aeschynomene aphylla Wild

Status: LR-nt

Endemism: Near-endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Quartzite endemic. Widespread.

Aeschynomene chimanimaniensis Verdc.

Status: LR-nt

Endemism: Near-endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Restricted distribution in Zimbabwe, more common in Mozambique.

Aeschynomene gazensis Baker f.

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Moist woodland

Only base of the Chimanimani, not on quartzite. Known from only a few localities.

Aeschynomene grandistipulata Harms

Status: LR-nt

Endemism: Near-endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Rocky

Quartzite endemic. Fairly widespread from the top to the base of the mountain, and fairly common.

Aeschynomene inyangensis Willd.

Status: LR-nt

Endemism: Near-endemic

Distribution: Eastern Highlands

Site: Nyanga and Chimanimani

Habitat: Grassland

On quartzite and Umkondo formations. Common on dolerite. Montane habitat, altitude 1,300–2,500 m. On

the Gondwano Plateau and also at the base.

Crotalaria phylloides Wild

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Not scarce on quartzite. Widespread.

Dalbergia melanoxylon Guill. & Perr.

Status: LR-nt

Distribution: Widespread

Habitat: Dry woodland

Habitat is heavy soil but fairly widespread. Coppices fairly regularly. Flowers and fruits from coppice growth in three years. Young plants from seeds also common. Exploitation in Zimbabwe is not particularly high. Wide African distribution.

Indigofera serpentinicola Schire

Status: LR-ic

Endemism: Endemic

Distribution: Great Dyke

Habitat: Grassland—Serpentine

Lotonotis serpentinicola Wild

Status: LR-ic

Endemism: Endemic

Distribution: Great Dyke (S)

Site: Birkdale pass, Lomagundi

Habitat: Grassland—Serpentine

Pearsonia metallifera Wild

Status: LR-ic

Endemism: Endemic

Distribution: Great Dyke (N & S)

Site: Chivu, Mpinga, Mutorashanga,

Habitat: Grassland—Serpentine

Serpentine soils. Found in huge patches. Five localities are known.

Pterocarpus angolensis DC.

Status: LR-nt

Threats: Forestry exploitation

Distribution: Widespread

Habitat: Dry woodland, moist woodland

Widespread in Zimbabwe. Habitat is much smaller than that of *Baikiaea plurijuga*. Coppices well—there are more juveniles than adults. Secondary colonizer, often accompanied by other plants. Heavily exploited in the last 40 years. Widespread and well represented outside Zimbabwe.

Rhynchosia stipata Meikle

Status: LR-nt

Endemism: Near-endemic

Distribution: Chimanimani

Site: Dragon's Tooth

Habitat: Grassland—Quartzite

Quartzite endemic. Recorded only on the Zimbabwean side of the mountains, but rumoured to also exist in Mozambique. Grows on quartzite cogs. Fairly widespread.

LOBELIACEAE

Belobelia cobaltica S.Moore

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Rocky

Quartzite endemic. Prefers rocky places, in crevices, gullies, in shade and sheltered conditions.

LOMARIOPSIDACEAE

Bolbitis gemmifera (Hieron.) C.Chr

Status: LR-nt

Distribution: Rusitu Valley

Site: Haroni Forest

Habitat: Moist forest; epiphyte
Widespread in Central Africa.

Elaphoglossum deckenii (Kuhn) C.Ch.

Status: LR-lc
Distribution: Nyanga
Site: Mount Inyangani
Habitat: Moist forest; epiphyte
This is a mountain specialist. Rarest species of the genus in Africa? Altitude: 1,900–2,000 m. Safe locality. Also in East Africa.

Elaphoglossum marojejyense Tardieu

Status: LR-lc
Distribution: Eastern Highlands
Site: Mount Inyangani, Chimanimani
Habitat: Moist forest
Rare, high altitude species. Habitats not threatened. Also in Madagascar.

Lomariopsis warneckei (Hieron.) Alston

Status: LR-nt
Distribution: Eastern Highlands
Site: Aberfoyle Tea Estates, Chirinda
Creeping rhizome. Very rare, never widespread. Does not produce readily from spores. Extremely widespread species on and off the African mainland.

MALVACEAE

Hibiscus gwandensis Exell

Status: LR-nt
Endemism: Endemic
Distribution: Limpopo/Save Lowveld
Site: Beitbridge, Buby Crossing (west of Mateke hills), Murungudzi
Habitat: Dry woodland
Among syenite rocks. Near *Hibiscus meyeri* and *H. okavangensis* but geographically far removed from both and differing in the length of the style-branches.

MELASTOMATACEAE

Dissotis pulchra A. & R.Fern.

Status: LR-nt
Endemism: Endemic
Distribution: Chimanimani
Site: Chimanimani
Habitat: Grassland—Quartzite
Quartzite endemic. Along streams. Locally common along streams, sometimes in rock crevices.

Pseudosbeckia swynnertonii (Baker f.) A. & R.Fern.

Status: LR-nt
Endemism: Endemic
Distribution: Chimanimani
Site: Chimanimani
Habitat: Grassland—Quartzite
Quartzite endemic. Rocky slopes, *Brachystegia* woodland and along rivers. Found on rocky slopes on high to lower altitudes. Occupies a wide range.

MORACEAE

Ficus exasperata Vahl

Status: LR-nt
Threats: Agriculture
Distribution: Rusitu Valley
Site: Haroni-Makurupini-Rusitu, possibly Vumba
Habitat: Moist forest

ORCHIDACEAE

Bolusiella maudiae (Bolus) Schltr.

Status: LR-nt
Threats: Collection, habitat degradation
Distribution: Eastern Highlands
Site: Vumba
Habitat: Moist forest; epiphyte

Riverine forest and woodland in high rainfall areas; rare. The species has probably been overlooked. It is a small epiphyte (twig epiphyte) with very small white flowers. Occurs in small or large colonies (50–100 observed once) as a thin blanket.

Cheirostylis gymnochiloides (Ridl.) Rchb.f.

Status: LR-lc
Threats: Collection, agriculture
Distribution: Rusitu Valley
Site: Rusitu
Habitat: Moist forest
Primitive orchid. Widespread but rare, in low numbers throughout its range. Does not multiply. Is a self-pollinator. Riverine forest. In KwoZulu-Notol (South Africa) in dune forest. Flowers from August to September.

Corymborkis corymbis Thouars

Status: LR-lc
Distribution: Chirinda
Site: Chirinda forest
Habitat: Moist forest
Occurs in lowland forests. Flowers in February. Known from very few places in Zimbabwe. Generally not collected. May be threatened in many parts of its range. Primitive orchid, a self-pollinator. Widespread in many countries.

Cynorkis anisoloba Summerh.

Status: LR-nt
Endemism: Endemic
Distribution: Eastern Highlands
Site: Nyanga Mountains, Tarka Forest Reserve, Chambuka River, Haroni-Makurupine Forest, Mtara Falls, Rhodes Nyanga Experiment Station, Pungwe Falls in Nyanga, Mount Nyangani southern slopes near Nyazengu Falls, Digby's Pool, Mount Nuza, Mubangazi River in Chimanimani, Outwa
Habitat: Grassland—Wetland
Known from many collections. A conspicuous and rare orchid. Habitat generalist. In damp or wet ground, in rock crevices or among short grasses, sometimes in deep shade. Altitude: 1,350–1,700 m.

Disa rhodantha Schltr.

Status: LR-nt
Threats: Habitat degradation
Distribution: Nyanga
Site: Inyangani Mountains
Habitat: Grassland
Wet grassland, a very restricted habitat. Widespread in South Africa, and it appears to be distinct from Zimbabwean population, but too little material to determine. Disjunct. Generally scarce. Possibly a distinct subspecies, but poorly known at this stage. Flowers December to February.

Eulophia macrantha Rolfe

Status: LR-nt
Endemism: Near-endemic
Distribution: Central Watershed
Site: Chipoli farm in Shamva
Habitat: Moist forest
Saprophyte known only from Molowi (Zimbo) and Zimbabwe. Was collected in 1958 from a locality in Chipoli Farm in Shomva. More data required. Often associated with bamboo.

Habenaria singularis Summerh.

Status: LR-lc
Endemism: Endemic
Distribution: Eastern Highlands, Central Watershed
Site: Chimanimani, Cleveland area near Harare, Gokwe
Habitat: Dambo
North, Central and Eastern Zimbabwe. In dombos and grassland, altitude of 1,500 m. Endemic to the Eastern Highlands and the watershed plateau near Harare (Cleveland). The species may also occur in Gokwe.

Habenaria subaequalis Summerh.

Status: LR-lc
Endemism: Endemic

Distribution: Eastern Highlands, Central Watershed
Site: Domboshava Hill at Goromonzi, Engwa, Chimanimani Range, Mutare, Troutbeck, North Downs, Nyanga
Habitat: Grassland—Wetland
Damp submontane or plateau grassland, usually in marshy ground, almost always amongst rocks. Habitat threatened. Known from several localities from eastern highlands, on the highest plateau.

Herschelianthe chimanimaniensis (H.P.Linder) H.P.Linder

Herschelia chimanimaniensis H.P.Linder
Status: LR-nt
Endemism: Near-endemic
Distribution: Chimanimani
Site: Chimanimani
Habitat: Grassland—Quartzite
Grows on the eastern Chimanimani quartzites. Habitat specific. Restricted to quartzites.

Holothrix macowaniana Rchb.f.

Status: LR-nt
Distribution: Eastern Highlands
Site: Mount Nuzi in Stapleford, Chimanimani
Habitat: Grassland
Grasslands. Flowers in August to October. Also in Eastern Cape forests, South Africa. The taxonomic identity needs checking.

Liparis chimanimaniensis G.Will.

Liparis sp. No. 1.
Status: LR-nt
Endemism: Endemic
Distribution: Chimanimani
Site: West of Point 71
Habitat: Grassland—Quartzite
Quartzite endemic. Well-drained rocky slopes in montane zone. Altitude of 2,000 m. Known only from type locality. Can easily be overlooked because of its size (5 cm tall). Inaccessible habitat.

Platylepis glandulosa (Lindl.) Rchb.f.

Status: LR-lc
Distribution: Nyanga
Habitat: Moist forest
A swamp forest species. Flowers in December to February. East, West and Tropical Africa.

Polystachya phirii Fiebeck

Status: LR-nt
Endemism: Endemic
Distribution: Limpopo Escarpment
Site: Buchwa, Bikita and surrounds
Habitat: Moist woodland
Severely fragmented because it prefers hilltops above 900 m. Communal land is on the lowlands. Mining could be a future threat.

Polystachya valentina la Croix & P.J.Cribb

Status: LR-nt
Endemism: Endemic
Threats: Fire
Distribution: Chimanimani
Site: Mount Peza
Habitat: Grassland—Quartzite
Quartzite, mountain slopes. Ground orchid found in grass. Widespread over the Chimanimani plateau. Altitude: 1,480–1,800 m. No horticultural threats. Minimal threat to both species and habitat.

PASSIFLORACEAE

Adenia karibaensis W.J.de Wilde

Status: LR-nt
Endemism: Endemic
Distribution: Zambezi Lowveld
Site: Kariba Gorge, Musingwa River in Mavuradonha Mountains, Bumi Escarpment, Rukowakova Escarpment in Gurube, Chenanga Camp in Gurube, Zambezi Escarpment
Habitat: Dry woodland
Endemic to Kariba, south of the Lake. Also along the

Zambezi Escarpment. Described in 1971. Confined to rocky savanna. Quite a few habitats where it is possibly found. Relatively inaccessible

Bersama swynnertonii Baker f.

Status: LR-lc

Endemism: Endemic

Distribution: Eastern Highlands

Site: Ngungunyawa Forest Reserve, Chiredza Gorge Forest in Chipinge, Edge of the Vumba forest, Chirinda Forest, T. Meikle Forest Research station in Stapleford, Chipete Forest Patch Forest in Chipinge, Orange Grave in Chimanimani

Habitat: Moist forest

In patches of evergreen forest, especially at edges and in kloof forest and riverine forest.

POACEAE

Danthoniopsis chimanimaniensis (Phipps) W.D.Clayt.

Status: LR-nt

Endemism: Near-endemic

Distribution: Chimanimani

Habitat: Grassland—Quartzite

Has a wide altitudinal range from the base of the mountain up to 1,600 m.

Eragrostis desolata Launert

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Mantane grasslands. 1,120–1,680 m.

POLYPODIACEAE

Microsorium pappei (Kuhn) Tardieu

Status: LR-lc

Distribution: Vumba, Nyanga

Site: Penhalonga, Vumba

Habitat: Moist forest

Is rare throughout its range. Probably not more widespread as reported in the literature.

PROTEACEAE

Protea enervis Willd

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Moderately high altitude, but widespread.

RUBIACEAE

Canthium oligocarpum Hiern subsp. *angustifolium* Bridson

Status: LR-nt

Endemism: Near-endemic

Distribution: Nyanga

Site: Nyanga, Chimanimani

Habitat: Moist forest

Fairly limited. High altitude. Rare plant, but well-protected in its natural habitat. Better protected but much rarer than Canthium racemosum.

Canthium racemosum S.Moore var. *racemosum* S.Moore

Status: LR-nt

Threats: Habitat degradation

Distribution: Limpopo/Save Lowveld

Site: South of Chipinge, Chipinda Pools, Save-Runde Junction area, Gonarezhou National Park

Habitat: Dry woodland

Same as it occurs on communal land. Widely distributed. Possibly in Malawi, also in Mozambique.

Lasianthus kilimandscharicus K.Schum.

Status: LR-lc

Distribution: Nyanga

Site: Mount Inyangani, Chimanimani

Habitat: Moist forest

Is well-represented outside Zimbabwe. Is fairly limited in Zimbabwe.

Leptactinia delagoensis K.Schum. subsp. *delagoensis*

Status: LR-lc

Distribution: Limpopo/Save Lowveld

Site: Tambahata, Save/Runde Junction

Very common in Mozambique. Also in South Africa.

Pauridiantha symlocoides (S.Moore) Bremek.

Status: LR-lc

Distribution: Eastern Highlands

Site: Stapleford

Habitat: Moist forest

Found high up at 2,000 m in Stapleford. In high altitude forest in inaccessible areas.

Pavetta comostyla S.Moore var. *comostyla* S.Moore

Status: LR-nt

Endemism: Endemic

Distribution: Eastern Highlands

Site: Chimanimani, Chirinda forest, Chipinge

Habitat: Moist forest

Altitude of 1,100–1,500 m.

Pavetta comostyla S.Moore var. *inyangensis* (Bremek.) Bridson

Status: LR-lc

Endemism: Near-endemic

Distribution: Eastern Highlands

Site: Vumba Mountain, Mount Inyangani in Nyanga, Mutare Heights, Chimanimani, Chirinda Forest, on top of Hanza Kap in Tsonzo

Habitat: Moist forest

An understory tree. Altitude: 1,100–1,800 m.

Rytigynia macrura Verdc.

Status: LR-nt

Distribution: Vumba

Site: Bunga, Leopard Rock

Habitat: Moist forest

High altitude forests are better protected than the low altitude ones. Where observed, it was seen in large numbers.

RUTACEAE

Teclea fischeri (Engl.) Engl.

Status: LR-nt

Threats: Habitat degradation

Distribution: Zambezi Lowveld

Site: Gokwe, Kanyemba

Habitat: Dry forest

Known only from dry forest patches in Gokwe

Kanyemba. Habitat under severe threat with people settling here. Could be widespread.

SANTALACEAE

Thesium bundiense Hilliard

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Quartzite endemic. Similar distributions to the other Thesium species. Possibly more Thesium species endemic to the Chimanimani.

Thesium chimanimaniense Brenan

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Bonde River, Airfield

Habitat: Grassland—Quartzite
Quartzite endemic. Open grassland. Similar distribution to other Thesium species. Possibly more Thesium species endemic to the Chimanimani.

Thesium dolichomeres Brenan

Status: LR-nt

Endemism: Endemic

Distribution: Chimanimani

Site: Summit of Skeleton Pass, Ben Nevis, Bundi River, Martin's Forest Reserve, Upper Haroni, Mountain Hut, 'Stanehenge'

Habitat: Grassland—Quartzite

Quartzite endemic. Widespread in the mountains on dry quartzite rocky slopes. Similar distribution to the other Thesium species. Possibly additional Thesium species endemic to the Chimanimani.

SAPINDACEAE

Aporrhiza nitida Gilg

Status: LR-nt

Distribution: Rusitu Valley

Site: Makurupini

Habitat: Moist forest

Common in outliers at low altitude up to 1,000 m.

Blighia unijugata Baker

Status: LR-nt

Threats: Habitat degradation

Distribution: Chirinda

Site: Chirinda forest

Habitat: Moist forest

Infrequent and very vulnerable in the outliers. A protected species in South Africa.

Deinbollia xanthocarpa (Klotzsch) Radlk.

Status: LR-nt

Distribution: Zambezi Lowveld, Limpopo/Save Lowveld

Site: Gokwe, Sabi valley

Habitat: Dry forest

Grows in riverine forest.

Filicium decipiens (Wight & Arn.) Thwaites

Status: LR-nt

Distribution: Rusitu Valley

Site: Makurupini forest

Habitat: Moist forest

Common in outliers at low altitude up to 1,000 m.

Stadmannia oppositifolia Poir. subsp. *rhodesiaca* Exell

Status: LR-nt

Distribution: Limpopo/Save Lowveld

Habitat: Dry woodland

Throughout the lowveld on hills. A scarce plant in eastern Zimbabwe.

SAPOTACEAE

Manilkara discolor (Sond.) J.H.Hemsl.

Status: LR-nt

Distribution: Limpopo/Save Lowveld

Site: Gonarezhou National Park

Habitat: Dry forest

Is a forest species. Distributed wider than Manilkara concolor.

Sideroxylon inerme L. subsp. *diospyroides* (Baker) J.H.Hemsl.

Status: LR-nt

Distribution: Limpopo/Save Lowveld

Site: Gonarezhou National Park

Habitat: Moist woodland

Common in this habitat.

Vitellariopsis ferruginea Kupicha

Status: LR-nt

Endemism: Endemic

Distribution: Limpopo Escarpment

Site: About 15 km south of Mutare on Dora Farm on road to Chimanimani near Bushman's paintings and grain storage bins boulders, Magahane Hill in Bikita, Bushman's summit in Zimunya Reserve, Chirenga Ruins near Matendere in Buhera, steep slope of Mhandambiri
Habitat: Rocky
Gronite hills, among rocks. Large habitat. Very common.

SCROPHULARIACEAE

Antherothamnus pearsonii N.E.Br.

Status: LR-1c
Distribution: Limpopo Escarpment—Matopos
Habitat: Rocky
Possibly more localities. Widespread. No real threats.

Jamesbrittenia carvalhoi (Engl.) Hilliard

Status: LR-1c
Endemism: Near-endemic
Distribution: Eastern Highlands
Site: Inyanga (Troutbeck); Pungwe Hills; Vumba Mountains; Mount Peza
Habitat: Grassland
Occurs at an altitude of 1,370–2,285 m. Grows in open mountain slopes or in scrubs above streams and on forest margins. Easily regenerates after fire.

Jamesbrittenia fodina (Wild) Hilliard

Sutera fodina Wild
Status: LR-1c
Endemism: Endemic
Distribution: Great Dyke (N & S)
Site: Rod Camp Mine, Makonde; Sebakwe; Mpinge Pass; Park, Kwekwe; Mhindamukova Pass, Chivi; Ruorka Ranch; Mhlaba Hills near Windsor Chrome Mine
Habitat: Grassland—Serpentine
Occurs on serpentine soils at an altitude of 1,200–1,680 m. Flowering is recorded during most months. Often associated with disturbances.

Jamesbrittenia myriantha Hilliard

Status: LR-1c
Endemism: Endemic
Distribution: Zambezi Lowveld
Site: Sebungwe District (Zambezi River); near Binga; Gokwe District (Sengwa Research Station); Gweru District (Gwelo)
Habitat: Wetland
Known from several localities in western and northwestern Zimbabwe. Known from drying mud along riverbank. It is sometimes regarded as a marsh weed.

Selago anatrachota Hilliard

Status: LR-1c
Endemism: Near-endemic
Distribution: Chimanimani
Site: Stonehenge, Long Gully, Bundi
Habitat: Grassland—Quartzite
Favours rocky areas in scrub. Roughly 1,700–1,800 m.

Selago swynnertonii (S.Moore) Hilliard var.

swynnertonii
Status: LR-1c
Endemism: Near-endemic
Distribution: Nyanga
Site: Nyahodi River; Inyangani (Jairei River road crossing; Odzani River Valley)
Habitat: Grassland
Ranges from Inyangani to Melssetter. Found in grassland between 1,500–2,600 m. Flowers throughout most of the year.

SELAGINELLACEAE

Selaginella imbricata (Forssk.) Spring ex Decne.

Status: LR-1c
Distribution: Zambezi Lowveld
Site: Zambezi Valley
Habitat: Rocky
Confined to basalts and associated geology. Is rare. Poikilohydrous—shrivels up in winter, therefore could have been overlooked. Habitat is resilient.

THYMELAEACEAE

Struthiola montana Peterson

Status: LR-nt
Endemism: Endemic
Distribution: Chimanimani
Site: Close to summit of Turret Towers
Habitat: Grassland—Quartzite
Quartzite endemic. Grows on high ridges, therefore limited in distribution. Said to be occasional.

Struthiola rhodesiana Peterson

Status: LR-nt
Endemism: Endemic
Distribution: Eastern Highlands
Site: Pungwe Falls and Hills, Nyanga Downs, Bunde Valley, 'Stonehenge' Plateau, Mount Peza, Mave River, summit of Point 71, Chimanimani Airfield
Habitat: Grassland
Recorded only from Chimonimoni and Nyongo.

ULMACEAE

Celtis gomphophylla Baker

Status: LR-1c
Distribution: Chirinda, Rusitu Valley
Site: Makurupini, Chirinda
Habitat: Moist forest

VELLOZIACEAE

Xerophyta argentea (Wild) L.B.Sm. & Ayensu

Vellazia argentea Wild
Status: LR-nt
Endemism: Endemic
Distribution: Chimanimani
Site: Mount Peza, 'Stonehenge'

Habitat: Rocky
Widespread within the locality.

VIOLACEAE

Rinorea convallarioides (Baker f.) Eyles

Status: LR-nt
Threats: Habitat degradation
Distribution: Eastern Highlands
Site: Chirundi, Makurupini, Vumba
Habitat: Moist forest
Outliers in Vumbo are under threat.

Rinorea ferruginea Engl.

Status: LR-nt
Threats: Habitat degradation
Distribution: Eastern Highlands
Site: Chirundi, Makurupini, Vumba
Habitat: Moist forest
Outliers of Vumbo are under threat.

VITACEAE

Cissus petiolata Hook.f.

Status: LR-nt
Threats: Collection
Distribution: Rusitu Valley
Site: Haroni-Makurupini
Habitat: Moist forest
Uncommon.

Cissus producta Afzel.

Status: LR-nt
Threats: Collection
Distribution: Rusitu Valley
Site: Haroni-Makurupini
Habitat: Grassland
Uncommon.



Wooded grassland and old workings for chromite in veins on the Great Dyke. (Photo: J. Timberlake)

ACANTHACEAE

***Acanthopale pubescens* (Lindau) C.B.Cl.**
Status: DD

***Barleria aromatica* Oberg.**
Status: DD

Endemism: Endemic?
Distribution: Great Dyke (S)
Site: Unspecified localities (Grassland and near Mutare).
Habitat: Grassland—Serpentine
Reported to be common on the soils of the Great Dyke. However, the taxonomic integrity of this species is uncertain, as it may be a synonym. No information available. Also possibly known from Zambia.

***Blepharis drummondii* Vollesen**
Status: DD
Endemism: Endemic
Distribution: Limpopo/Save Lowveld
Site: Fishans (Gonarezhou National Park)

Brillantaisia pubescens* Oliv. var. *pubescens
Status: DD

***Dyschoriste capricornis* C.B.Clarke**
Status: DD

***Dyschoriste pilifera* Hutch.**
Status: DD

***Hygrophila cataractae* S.Moore**
Status: DD

***Mellera nyassana* S.Moore**
Status: DD

***Mellera submutica* C.B.Cl.**
Status: DD

***Pseudocalyx saccatus* Radlk.**
Status: DD

***Ruellia setosa* (Nees) C.B.Clarke**
Status: DD
Endemism: Near-endemic?

***Scleriton coeruleus* (Lindau) S.Moore**
Status: DD

***Thunbergia petersiana* Lindau**
Status: DD

***Thunbergia reticulata* Hochst. ex Nees**
Status: DD

***Thunbergia schimbensis* S.Moore**
Status: DD
Endemism: Near-endemic?

***Thunbergia subulata* Lindau**
Status: DD

ALOACEAE

***Aloe munchii* Christian**
Status: DD
Endemism: Endemic
Distribution: Chimanimani
Site: Chimanimani
Habitat: Grassland—Quartzite

***Aloe musapana* Reynolds**
Status: DD
Endemism: Endemic
Distribution: Chimanimani (N)

Site: Musapa Mountain, Groenkeop
Habitat: Grassland—Quartzite?
Grows on sheer rock surfaces out of reach of fire, in full sun.

AMARYLLIDACEAE

***Scadoxus puniceus* (L.) Friis & Nardal**
Status: DD
Distribution: Limpopo Escarpment—Matopos
Known from Matopos.

ASCLEPIADACEAE

***Brachystelma furcatum* C.Boele**
Status: DD
Endemism: Endemic
Distribution: Limpopo Escarpment—Matopos
Site: Matopos District, Longsdale, Matopos Research Station
Habitat: Dry woodland
Known only from the type collection (1959) from mopone woodland in very saline soil.

***Brachystelma hirtellum* Weim.**
Status: DD
Distribution: Nyanga
Very scarce in Zimbabwe.

***Brachystelma lancasteri* C.Boele**
Status: DD
Endemism: Endemic
Distribution: Central Watershed
Site: In the vicinity of the Bulawayo Station in the direction of Victoria Falls; 20 km east of Bulawayo
Habitat: Grassland
Found in open grassland. The species appears to be confined to a small area in and around Bulawayo.

***Brachystelma punctatum* C.Boele**
Status: DD
Endemism: Endemic
Distribution: Central Watershed/Northwest Zimbabwe
Site: Chegutu District, Poole Farm; Hwange
Habitat: Moist woodland, Dry woodland
Two colour forms are reported (yellow-green and moroon with yellow dots). Found in Julbernardia woodland where it is fairly uncommon.

Duvalia polita* N.E.Br. var. *polita
Status: DD
Habitat: Dry woodland
In river valleys at low altitudes on brack soils with mopone or Acacia species.

***Hoodia lugardii* N.E.Br.**
Status: DD
Habitat: Dry woodland
Very restricted distribution.

Huernia hystrix* N.E.Br. var. *hystrix
Status: DD
Distribution: Limpopo/Save Lowveld
Site: Save/Runde Junction. Also in Buhera District
Habitat: Rocky
Just extends into Zimbabwe. Found in dry, rocky environments.

***Huernia kirkii* N.E.Br.**
Status: DD
Distribution: Limpopo/Save Lowveld
Site: Save/Runde Junction
Very restricted distribution.

***Huernia levyi* Oberg.**
Status: DD
Threats: Habitat degradation

Distribution: Zambezi Lowveld/Northwestern Zimbabwe
Site: From Doma to Pandamatenga
Habitat: Rocky
Very scattered distribution and known only from a few localities in dry rocky areas.

***Huernia oculata* L.C.Leach & Plowes**
Status: DD
Endemism: Endemic
Distribution: Limpopo Escarpment
Site: Kyle, Mushonganeburi hill (Matibi Mission), Mlene Mission and Great Zimbabwe, Zaka and Ndanga, Hills between Mvuma and Masvingo
Habitat: Dry woodland
This species grows under vegetation on the dwolos. No threats are evident here. Recorded only from Masvingo District.

Huernia verekeri* Stent var. *verekeri
Status: DD
Distribution: Limpopo/Save Lowveld
Site: Save Valley, around Nyanyadzi and Biriwiri
Habitat: Dry woodland
Known to hybridise.

***Neoschumannia cardinea* (S.Moore) Meve**
Swynnertonia cardinea S.Moore
Status: DD
Distribution: Chirinda
Site: Chirinda forest
Habitat: Moist forest
There is a relict population in Ngungunyano Forest Reserve. Specimens in SRGH were collected in 1976. Also known from Tanzania.

***Orbea maculata* (N.E.Br.) L.C.Leach**
Status: DD

***Orbea umbracula* (M.D.Hend.) L.C.Leach**
Status: DD
Endemism: Endemic
Distribution: Eastern Highlands, Limpopo/Save Lowveld
Site: Between Mutare and Masvingo, and Gonarezhou, Chese Rest Camp (Lomagundi), Marange, Banti Forest Reserve, Bikita, Guluene river (6 km north of Malunge pan in Nuanetsi), Dorowa, Moodies Pass
Found in a number of different habitats.

***Orbeopsis gossweileri* (S.Moore) L.C.Leach**
Status: DD
Distribution: Central Watershed
Site: Nyamandhlovu
Known only from a single individual. It is probably more widespread but has just been overlooked.

***Pachycymbium lugardii* (N.E.Br.) M.Gilbert**
Status: DD
Distribution: NW Zimbabwe
Site: Hwange District
Known only from a few collections in Zimbabwe.

***Pachycymbium ubomboense* (I.Verd.) M.G.Gilbert**
Status: DD
Distribution: Chirinda, Limpopo Escarpment, Limpopo/Save Lowveld
Site: Chirinda Forest, junction of Sabi and Lundi River, Gutu, Bukwa Mountain
Habitat: Rocky
Very restricted habitat. In shaded stony ground.

***Stapelia gigantea* N.E.Br.**
Stapelia cylista C.A.Lückh.
Status: DD
Distribution: Limpopo/Save Lowveld
Site: Save/Rundi Junction
Habitat: Dry woodland
*Just tips into the country. There is some doubt that this may be *S. nobilis* N.E.Br. which has been sunk; is*

separable from *S. gigantea* and should be given infraspecific status. *S. nobilis* is widespread on the granites in this area.

***Trachycalymma fimbriatum* (Weim.) Bullock**
Status: DD
 Endemism: Near-endemic?
 Distribution: Nyanga
 Site: Pungwe Hills
 Also found on Molowi's Mount Mulonje.

ASPLENIACEAE

***Asplenium gemmascens* Alston**
Status: DD
 Distribution: Chimanimani
 Site: Mount Peni
 Habitat: Moist forest
 Known only from Molowi, Mozambique and Zimbabwe.

***Asplenium trichomanes* L.**
Status: DD
 Distribution: Nyanga
 Site: Mount Inyangani on summit
 Habitat: Grassland
 This is the only Flora zambesiaca record for this species (in Zimbabwe). It co-occurs with *Asplenium ulighii* on the summit of Mount Inyangani.

***Asplenium ulighii* Hieron.**
Status: DD
 Distribution: Nyanga
 Site: Mount Inyangani
 Habitat: Grassland
 Initially thought to be a depouperate form of *A. aethiopicum*. Associated with mountain peaks. 2,600 m. Widespread African distribution.

ASTERACEAE

***Helichrysum serpentinicola* Wild**
Status: DD
 Endemism: Endemic
 Distribution: Great Dyke (S)
 Site: Shurugwi, Gweru, Ngezi Dam
 Habitat: Grassland—Serpentine

***Nicolasia pedunculata* S.Moore subsp. *thermalis* Wild**
Status: DD
 Endemism: Endemic
 Distribution: Zambezi Lowveld
 Site: Binga hot springs
 Habitat: Wetland
 Seems to be endemic to the somewhat saline water of the Binga hot springs.

***Vernonia rhodesiana* S.Moore**
Status: DD
 Endemism: Endemic
 Distribution: Central Watershed
 Site: Miami
 Habitat: Moist woodland
 Known only from type locality.

CRASSULACEAE

***Crassula cooperi* Regel var. *subnodulosa* R.Fern.**
Status: DD
 Endemism: Endemic
 Distribution: Central Watershed
 Site: Lomagundi, Mutare
 Habitat: Moist woodland
 In humus pockets among dolomite, granite or limestone boulders, on rocky outcrops in sheltered gullies and woodland.

***Crassula nodulosa* Schonland var. *nodulosa* forma *rhodesica* R.Fern.**
Status: DD
 Endemism: Endemic?

Distribution: Central Watershed, Limpopo Escarpment
 Site: Macheke, Odzi, Nyoni Hills
 Habitat: Grassland—Moist woodland
 Grows in grassland, bushveld in rocky situations in mountains up to 2,200 m. May also occur outside Zimbabwe.

***Crassula setulosa* Harv. var. *setulosa* forma *latipetala* R.Fern.**
Status: DD
 Endemism: Endemic
 Distribution: Chimanimani
 Site: Mount Peni
 Habitat: Rocky
 Known only from the type specimen. A herb forming dense clusters at the top of rocky places.

***Kalanchoe lobata* R.Fern.**
Status: DD
 Endemism: Endemic
 Distribution: Central Watershed
 Site: Harare, near Mutare
 Habitat: Moist woodland
 Approaches *K. laciniata* by the indumentum, formed by more distinct glandular-headed hairs. Differs in length of calyx, shape and size of sepals, shape and size of corolla-tube and lobes.

***Kalanchoe wildii* Raym.-Hamet**
Status: DD
 Endemism: Endemic
 Distribution: Limpopo Escarpment—Matopos
 Site: Matobo District, Mnene Mission, Shurugwi
 Habitat: Rocky
 On rocks.

CUCURBITACEAE

***Corallocarpus triangularis* Cogn.**
Status: DD
 Threats: Urban expansion
 Distribution: Limpopo/Save Lowveld
 Site: Beitbridge
 Habitat: Dry woodland
 Lost record of existence in wild 10 years ago, at which time the habitat was being adversely affected by building/development. Not recorded in Flora zambesiaca as occurring in Zimbabwe.

***Cucumis humifructus* Stent**
Status: DD
 Distribution: Central Watershed, Limpopo/Save Lowveld
 Site: Matopos, Chegata
 Habitat: Dry woodland
 Deep sandy soils in oordvork habitats. Dependent on oordvork survival. Geocarpic fruit unique to family, maturing 15–30 cm underground. Regeneration dependent on fruit being dug up and eaten by oordvork.

ERICACEAE

***Erica simii* (S.Moore) E.G.H.Oliv.**
Status: DD
 Endemism: Endemic?
 Distribution: Nyanga
 Habitat: Grassland
 Low altitude at 1,500 m.

ERIOCAULACEAE

***Eriocaulon matopoense* Rendle**
Status: DD
 Endemism: Endemic
 Distribution: Central Watershed
 Site: Besna Kobila Farm (Matopos), Mansala river-Shamva road junction (Harare), Rusape, Mermaid's Pool, Goromonzi and Nyanga, Nyamunyechi Estate, Chikomba Vlei (Hurungwe), Marondera
 Habitat: Wetland

Marshy ground and in shallow water of streams; 1,500 m.

***Eriocaulon wildii* S.M.Phillips**
Status: DD
 Endemism: Endemic
 Distribution: Nyanga
 Site: Van Niekerk ruins (Ngarawe River, Nyanga)
 Habitat: Wetland
 By river, wet sand; 1,220 m.

ERIOSPERMACEAE

***Eriospermum cecilii* Baker**
Status: DD
 Endemism: Near-endemic
 Distribution: Nyanga, Chimanimani
 Site: Musapa Mountain, Pungwe falls, World's View, Troutbeck, Fort Hill

EUPHORBIACEAE

***Croton madandensis* S.Moore**
Status: DD
 Distribution: Limpopo/Save Lowveld
 Habitat: Dry woodland
 In Zimbabwe in low dry southeast. Shrub or tree.

***Euphorbia monteiroi* Hook.f. subsp. *ramosa* L.C.Leach**
Status: DD
 Distribution: Central Watershed (W)
 Habitat: Dry woodland
 Scattered colonies in extreme western Zimbabwe along Botswana border.

***Euphorbia rowlandii* R.A.Dyer**
Status: DD
 Distribution: Limpopo/Save Lowveld
 Site: Limpopo Valley, 30 km west of Pafuri
 Habitat: Dry woodland
 Very innocuous and not visited by many people. Limited distribution in Zimbabwe. Known from outside Zimbabwe.

***Jatropha loristipula* Radcl.-Sm.**
Status: DD
 Endemism: Endemic
 Distribution: Limpopo/Save Lowveld
 Site: Beitbridge
 Habitat: Dry woodland
 In mopane-Combretum woodland. 305 m.

***Jatropha monroi* S.Moore**
Jatropha cervicornis Suss.
Status: DD
 Endemism: Endemic
 Distribution: Central Watershed
 Site: Marondera, Masvingo
 Not recorded from elsewhere. The ecology data are not available. Known only from a few old collections such as at Fort Victoria 1909–1912 by Monro 2187 BM.

***Jatropha spicata* Pax**
Jatropha messinica E.A.Bruce
Status: DD
 Distribution: Limpopo/Save Lowveld
 Site: Sabi Experimental Station, Beitbridge
 Habitat: Dry woodland
 Well-represented outside Zimbabwe. Locally extremely common.

***Monadenium kimberleyana* G.Will.**
Status: DD
 Endemism: Endemic
 Distribution: Limpopo/Save Lowveld
 Site: Chisumbanje east (5 km north of Muembe and east of Rimbi)
 Habitat: Dry forest
 Apparently known only from the type locality. Often found in association with *Aloe suffulta*. 1,200 m.

Found in sandveld in thicket periphery. Appears to be restricted to southeastern Zimbabwe.

Tragia mazaensis Radcl.-Sm.

Status: DD

Endemism: Endemic

Distribution: Great Dyke (N)

Site: Vanad Pass, Mutorashanga

Habitat: Grassland—Serpentine

Open treeless grossy hillsides, often on termite mounds.

GESNERIACEAE

Streptocarpus cyanandrus B.L.Burt

Status: DD

Endemism: Endemic

Distribution: Nyanga

Site: World's View, Downs—Terrace Towers

Habitat: Moist forest

Under rock overhangs.

ISOETACEAE

Isoetes schweinfurthii A.Braun

Isoetes rhodesiana Alston; *Isoetes alstonii* Reed & Verdc.

Status: DD

Distribution: Central Watershed

Site: Zambezi Basin and wetlands, Nyamandhlovu

Habitat: Wetland

Taxonomy of this complex needs to be resolved. In Zimbabwe, it is also referred to as I. rhodesiana Alston or I. alstonii Reed & Verdc., considered by some to be endemic. Grows in open ponds.

LEGUMINOSAE: PAPILIONOIDEAE

Indigofera longepedunculata Gillett

Status: DD

Endemism: Endemic

Distribution: Nyanga

So far recorded only from Zimbabwe.

Indigofera parviflora B.Heyne ex Wight & Arn.

var. **crispidula** J.B.Gillett

Indigofera parviflorum (Heyne ex Wight & Arn) Schrire

Status: DD

Endemism: Endemic

Check the taxonomic status of this species.

Indigofera seburgweensis Gillett

Status: DD

Endemism: Endemic

Distribution: Zambezi Lowveld

Site: Karingwe Hill, Lusulu (Binga)

Habitat: Dry woodland

Only one specimen was collected from Bingo. Grows on sandstone outcrops.

Indigofera tenuis Milne-Redh. subsp. **major** Gillett

Status: DD

Endemism: Endemic

May be sunk under *I. dissitiflora* Schrire.

Rhynchosia totta (Thunb.) DC. var. **elongatifolia** Verdc.

Status: DD

Endemism: Endemic

Distribution: Great Dyke

Habitat: Grassland—Serpentine

On grossy hill slopes.

Saphara velutina Lindl. subsp. **zimbabwensis**

J.B.Gillett & Brummitt

Status: DD

Endemism: Endemic

Distribution: Limpopo Escarpment—Kyro

Site: Northwest of Great Zimbabwe, Buffalo Loop (Kyle National Park), Popoteke Gorge (Kyle National Park),

Masvingo

Habitat: Dry woodland

Tephrosia chimanimaniana Brummitt

Status: DD

Endemism: Endemic

Distribution: Chimanimani

Habitat: Grassland—Quartzite

Tephrosia elongata E.Mey. var. **lasiacaulis**

Brummitt

Status: DD

Endemism: Endemic

Distribution: Central Watershed

Site: Matopos, Nyanga

Tephrosia festina Brummitt

Status: DD

Endemism: Endemic

Distribution: Eastern Highlands

Tephrosia lurida Sonder var. **drummandii**

Brummitt

Tephrosia longipes Meisn.

Status: DD

Endemism: Endemic

Distribution: Chimanimani

Site: Chimanimani

Habitat: Grassland—Quartzite

Tephrosia rupicola Gillett subsp. **dreweana**

Brummitt

Status: DD

Endemism: Endemic

Tephrosia rupicala Gillett subsp. **rupicola**

Status: DD

Endemism: Endemic

LOBELIACEAE

Cyphia alba N.E.Br.

Status: DD

Endemism: Endemic

Distribution: Chimanimani

Site: Summit of Mount Peza

Habitat: Grassland—Quartzite

Occurs in upland grassland.

LYCOPODIACEAE

Lycopodium phlegmaria L.

Status: DD

Distribution: Nyanga

Site: Aberfoyle Tea Estate (Upstream Sports Club-site record)

Recently reported to occur only on one locality; one clump of trees in Zimbabwe.

LYTHRACEAE

Rotala wildii A.Fern.

Status: DD

Endemism: Endemic

Distribution: Northeastern Lowveld

Site: Mtoko

Habitat: Moist forest

Known only from granite hills. Sunk under *R. lucalensis* R.Fern. & Diniz.

MALPIGIACEAE

Triaspis dumeticola Launert

Status: DD

Endemism: Endemic

Distribution: Limpopo Escarpment—Matopos

Site: Maleme Dam

Habitat: Dry woodland

On edges and openings of woodland. Known only from type specimen.

MALVACEAE

Pavania rogersii N.E.Br.

Status: DD

Endemism: Endemic

Distribution: Zambezi Lowveld

Site: Gwai-Letopi Junction in Hwange, Binga

Habitat: Dry woodland

MELIACEAE

Turraea fischeri Gürke subsp. **eylesii** (Bakerf.)

Styles & White

Turraea eylesii Baker f.

Status: DD

Endemism: Endemic

Distribution: Central Watershed

Site: Matopo Hills, Bulalimangwe, Khami ruins

Habitat: Dry woodland

Granite hills.

ORCHIDACEAE

Banatea speciosa (L.f.) Willd.

Banatea densiflora Sond.

Status: DD

Distribution: Eastern Highlands, Central Watershed

Site: Marondera, Chimanimani village

Habitat: Moist forest

Open deciduous woodland species. Common coostol scrub species, also on forest margins and in savanna. Was previously known as B. speciosa var. speciosa. Occurs in South Africa and elsewhere.

Didymoplexis africana Summerh.

Status: DD

Distribution: Vumba

Site: Vumba

Habitat: Moist forest

Widespread in Africa. One old collection in Zimbabwe.

Lost collected in 1976. Just needs to be recollected, but is probably widespread. The identity of this specimen is doubtful.

Eulophia angolensis (Rchb.f.) Summerh.

Status: DD

Threats: Desiccation, collection

Distribution: Central Watershed

Site: Harare, Mutoko, Tarka

Habitat: Wetland

Large plants, rare but very conspicuous with big yellow flowers (height of 1–1.5 m tall). Common throughout Africa. Is diminishing. Habitat is very wet parts of dombos, threatened habitat. Rarely seen.

Eulophia coeloglossa Schltr.

Status: DD

Threats: Desiccation

Distribution: Central Watershed

Site: Mvurwi, Rusape

Habitat: Dambo

Widespread throughout Zimbabwe and Africa, but hardly ever seen. Known from seasonal dombos which are threatened as a result of desiccation.

Eulophia flavopurpurea Rolfe

Status: DD

Threats: Desiccation

Distribution: Central Watershed

Site: Mazoe

Habitat: Dambo

Widespread throughout Zimbabwe and Africa, but hardly ever seen. Known from seasonal dombos, which are threatened as a result of desiccation.

Eulophia horsfallii (Bateman) Summerh.

Status: DD

Threats: Desiccation

Distribution: Central Watershed

Site: Harare, Mutare, Masvingo

Habitat: Dambo

Large, conspicuous plants with big yellow/purple/brown/pink flowers, and up to 2 m tall. Found throughout the whole of Tropical Africa. Is diminishing. Seen in very wet, lentic parts of dombos around Harare, thrive in shade. Dombos are threatened habitats.

***Eulophia inyangensis* Summerh.**

Eulophia manticala Schltr.

Status: DD

Distribution: Nyanga

Site: Imyanyani, Mutane

Habitat: Grassland

The species was sunk under *E. manticala*. Considered rare. Well-drained rocky slopes in mantane zone at an altitude of 2,300 m. Endemic to the Nyanga Mountains. The taxonomy remains dubious.

***Eulophia kyimbilae* Schltr.**

Status: DD

Threats: Desiccation

Distribution: Central Watershed

Site: Harare

Habitat: Dambo

Widespread throughout Zimbabwe and Africa, but hardly ever seen. Has a scattered distribution. Known from seasonal dombos which are threatened as a result of desiccation.

***Eulophia milnei* Rchb.f.**

Status: DD

Threats: Desiccation

Distribution: Central Watershed

Site: Matopos, Marondera, Chimanimani

Habitat: Dambo

Widespread throughout Zimbabwe and Africa, but hardly ever seen. Known from seasonal dombos which are threatened as a result of desiccation. Small plant.

***Eulophia tanganyikensis* Rolfe**

Status: DD

Threats: Desiccation

Distribution: Central Watershed

Site: Harare

Habitat: Dambo

Widespread throughout Zimbabwe and Africa, but hardly ever seen. Known from seasonal dombos which are threatened as a result of desiccation.

***Habenaria anaphysemia* Rchb.f.**

Status: DD

Threats: Desiccation

Distribution: Central Watershed, Chimanimani

Site: Marondera, Chimanimani

Habitat: Dambo

In threatened dombos. Well-represented in countries outside Zimbabwe.

***Habenaria armatissima* Rchb.f.**

Status: DD

Threats: Desiccation

Distribution: Central Watershed

Site: Umvumvumu Gorge

Habitat: Dambo

In threatened dombos. Well-represented in countries outside Zimbabwe.

***Habenaria calvilabris* Summerh.**

Status: DD

Threats: Desiccation

Distribution: Central Watershed

Site: Makonde, Harare

Habitat: Dambo

In threatened dombos. Well-represented in countries outside Zimbabwe.

***Habenaria cornuta* Lindl.**

Status: DD

Threats: Desiccation

Distribution: Central Watershed

Site: Miami, Harare

Habitat: Dambo

In threatened dombos. Well-represented in countries

outside Zimbabwe. It is better protected here than in other parts of the country.

***Habenaria epipactidea* Rchb.f.**

Status: DD

Threats: Desiccation

Distribution: Central Watershed

Site: Marondera, Nyanga

Habitat: Dambo

In threatened dombos. Well-represented in countries outside Zimbabwe.

***Habenaria galactantha* Kraenzl.**

Status: DD

Threats: Desiccation, grazing

Distribution: Central Watershed

Habitat: Dambo

In threatened dombos. Well-represented in countries outside Zimbabwe. Areas are heavily populated and cattle pose a threat to vegetation.

***Habenaria holothrix* Schltr.**

Status: DD

Threats: Desiccation, grazing

Distribution: Central Watershed

Site: Harare

Habitat: Dambo

In threatened dombos. Well-represented in countries outside Zimbabwe. Areas are heavily populated and cattle pose a threat to vegetation.

***Habenaria holubii* Rolfe**

Status: DD

Threats: Desiccation

Distribution: Central Watershed (W)

Site: Leshoma Valley

Habitat: Dambo

In threatened dombos. Well-represented in countries outside Zimbabwe. Western Zimbabwe is the driest part of the highveld. Status currently unknown.

***Habenaria ichneumonea* (Sw.) Lindl.**

Status: DD

Threats: Desiccation, grazing

Distribution: Central Watershed

Site: Harare, Masvingo

Habitat: Dambo

In threatened dombos. Well-represented in countries outside Zimbabwe. Areas are heavily populated and cattle pose a threat to vegetation.

***Habenaria rautaneniana* Kraenzl.**

Status: DD

Threats: Desiccation

Distribution: Central Watershed (N)

Site: Doma, Harare

Habitat: Wetland-Dambo

In threatened dombos. Well-represented in countries outside Zimbabwe. Observed on stote land.

***Habenaria stenorhynchos* Schltr.**

Status: DD

Threats: Desiccation

Distribution: Central Watershed

Site: Harare, Masvingo

Habitat: Dambo-Grassland

In dombos subjected to desiccation. Well-represented in countries outside Zimbabwe.

***Habenaria tridens* Lindl.**

Status: DD

Threats: Desiccation

Distribution: Central Watershed (E)

Site: Haroni Gorge

Habitat: Wetland-Dambo

Dombos, threatened habitat as a result of desiccation. Well-represented in countries outside Zimbabwe.

***Habenaria weberiana* Schltr.**

Status: DD

Threats: Desiccation

Distribution: Central Watershed

Site: Harare

Habitat: Dambo

In dombos, threatened habitat as a result of desiccation. Well-represented in countries outside Zimbabwe.

***Habenaria zambesina* Rchb.f.**

Status: DD

Threats: Desiccation, grazing

Distribution: Central Watershed

Site: Harare

Habitat: Dambo

Seasonal wetlands such as dombos, threatened habitat as a result of desiccation. Well-represented in countries outside Zimbabwe. Areas are heavily populated and cattle pose a threat to vegetation.

***Holothrix micrantha* Schltr.**

Status: DD

Threats: Afforestation

Distribution: Nyanga

Site: Dannakay Hotel

Habitat: Grassland

Only appears after fire, so it may be more common than records indicate. Also occurs in Gouteng (South Africa). Flowers from September to October. The taxonomic identity needs checking. Known from one locality in Zimbabwe; collected once in 1949. Area now under wattle.

PASSIFLORACEAE

***Basananthe parvifolia* Afzel.**

Trypshastemma parvifolium Baker f.

Status: DD

Endemism: Endemic

Distribution: Chimanimani

Site: Musapa Mountains in Chimanimani, Fortune Farm in Chipinge, Tandai Falls in Chimanimani, Tarka Forest Reserve in Chimanimani

Habitat: Grassland-quartzite

Grassland and open forest.

POACEAE

***Aristida brainii* Melderis**

Aristida serrulata sensu Stent & Rattray

Status: DD

Endemism: Endemic

Distribution: NW Zimbabwe, Zambezi Lowveld

Site: Victoria Falls, Hwange, Kariba

Recorded only from Zimbabwe. Easily confused with *A. serrulata* recorded from Eritrea.

***Aristida hispidula* Henrard**

Status: DD

Endemism: Endemic

Distribution: Central Watershed

Site: Darwendale, Nyamantlovu, Rundi River

Habitat: Grassland

In chrame-rich grasslands and dombos.

***Craspedorhachis digitata* Kupicha & Cope**

Status: DD

Endemism: Endemic

Distribution: Limpopo Escarpment

Site: Mhakwe Hill (Wedza), Mount Hozvi (Bikita)

Habitat: Rocky

Granite outcrops often in block soils in fissures of exposed granite domes.

***Eragrostis glischna* Launert**

Status: DD

Endemism: Endemic

Distribution: NW Zimbabwe

Site: Chizarira Game Reserve, Mandavu Dam near Sinamatella

Habitat: Dry woodland

Hot dry areas. Often in mopane woodland, rocky places.

POLYGALACEAE

Polygala westii Exell**Status:** DD

Endemism: Endemic

Distribution: Limpopo Escarpment—Matopos

Site: Matopos

Known only from the type specimen.

PORTULACACEAE

Portulaca rhodesiana R.A.Dyer & E.A.Bruce**Status:** DD

Endemism: Endemic

Distribution: Central Watershed

Site: Matopos and Ngomakurira (Chinamhara)

Habitat: Rocky

A pioneer in the hallows of bare, granitic outcrops, developing as an ephemeral in the course of the rainy season.

PROTEACEAE

Faurea saligna Harv. subsp. *xanthoneura* Merxm.**Status:** DD

Endemism: Endemic

Dubious taxonomy.

Protea asymmetrica Beard**Status:** DD

Endemism: Endemic

Distribution: Nyanga

Site: Mount Inyangani (western slope), Chingamwe

Plateau

Habitat: Grassland

Known from a single subpopulation. Coarse grassland.

Protea inyanganiensis Beard**Status:** DD

Endemism: Endemic

Distribution: Nyanga

Site: Summit of Mount Inyangani

Habitat: Grassland

Found only in a small area on the summit of Mount Inyangani. Grows among rocks in peaty tussock grassland. Said to require racks for fire protection. Sunk under *P. dracomontana* Beard, but has been kept separate in Zimbabwe.

RUBIACEAE

Pavetta sp. near *lasiopeplus* fide Bridson**Status:** DD

Distribution: Limpopo/Save Lowveld

Site: Between Chipinda Paals and Chiredzi

Habitat: Dry forest

Known from only two other disjunct localities in Malawi (Lengwe Game Reserve) and Chipingo. Very little herbarium material available. The subpopulations in

Malawi and Zimbabwe both exhibit similar differences to *P. zeyheri* and *P. lasiopeplus*. Found in dense evergreen forest.

Rytigynia sp. D of FZ**Status:** DD

Endemism: Endemic

Distribution: Chimanimani

Site: Below Mount Peza

Habitat: Moist forest

Dense evergreen rainforest in a large valley. Very distinct-looking species.

Sericanthe odoratissima (K.Schum.) Robbrecht subsp. *B* Bridson ined.**Status:** DD

Endemism: Endemic

Distribution: Eastern Highlands

Site: Stapleford Forest Reserve (Mutare District)

Habitat: Moist forest

Within or at edge of mixed evergreen forest. 1,400–1,830 m. Only known from the Mutare District.

Sericanthe sp. fide Bridson**Status:** DD

Endemism: Endemic

Threats: Habitat degradation

Distribution: Limpopo Escarpment—Chipinga

Site: Chipinga District

Known from a number of old and recent collections, all from the same locality.

SCROPHULARIACEAE

Buchnera androsacea Merxm.**Status:** DD

Endemism: Endemic

Distribution: Central Watershed

Site: Enterprise, Marondera

Habitat: Grassland

Grasslands. Said to be similar to *B. hockii* De Wilde, but the basal leaves do not turn black on drying.

Buchnera pusilliflora S.Moore**Status:** DD

Endemism: Endemic

Distribution: Central Watershed

Site: Miami, Dambashava, Besna Kabila Farm, Mazoe

Habitat: Grassland

In open grasslands on well-drained soils. Can be confused with *B. randii* S.Moore.

Manulea rhodesiana S.Moore**Status:** DD

Endemism: Endemic

Distribution: Central Watershed

Site: Macheke, Makaholi (Masvingo), Juliasdale

(Nyanga)

Habitat: Grassland

Wet grassland bordering rivers and streams, also a weed of roadsides and cultivation, 1,000–1,850 m.

Selago goetzei Rolfe subsp. *ambigua* Hilliard*Wolofrida goetzei* (Rolfe) Brenan var. *pubescentior* Brenan**Status:** DD

Endemism: Endemic

Distribution: Eastern Highlands

Site: Nyanga, Chimanimani (near Saverambe boundary)

Habitat: Grassland

Mantone grasslands.

Selago swynnertonii (S.Moore) Hilliard var. *leiophylla* (Brenan) Hilliard**Status:** DD

Endemism: Endemic

Distribution: Nyanga

Site: Juliasdale, Nyanga National Park

Habitat: Grassland

Known mainly from roadsides and firebreaks. Known only from Mount Inyangani.

Selago thyrsoidea Baker var. *austrorhodesica* Brenan**Status:** DD

Endemism: Endemic

Distribution: Eastern Highlands

Site: Nyanga

Altitude of 2,400 m.

Stemodiopsis eylesii S.Moore**Status:** DD

Endemism: Endemic

Distribution: Central Watershed

Site: Iron Mask Hill, Mazowe

Habitat: Moist woodland

Cliff crevices. Known only from the type specimen.

Torenia monroi (S.Moore) Philcox*Craterastigma monroi* S.Moore**Status:** DD

Endemism: Endemic

Distribution: Central Watershed

Site: Nyamahere Hill, Mutoko, Mount Jim in Bulalima

Mangwe, Gwenara Dam, Gweru and Save Drift, Mutare

Habitat: Wetland

Known from ephemeral rock pools. 800–1,400 m.

VITACEAE

Cyphostemma graniticum (Wild & R.B.Drumm.) Wild & R.B.Drumm.**Status:** DD

Endemism: Endemic

Distribution: Central Watershed, Great Dyke (N)

Site: Nyamunyeche Estate (Guruvu), Vanad Pass,

Mutorashanga Pass, Rod Camp Mine, Ruorka Ranch,

Horse Shoe Mine, Kandeya Nature Reserve

(Mavuradonha Hill slopes), Ngomakurira, Domboshava

Hill, Munanga Farm (Makoni)

Habitat: Moist forest, grassland

Favours granite rocks in grasslands. Also grows on chame hills on the Great Dyke.



Fynbos-like vegetation in Nyanga. (Photo: J. Timberlake)

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1994 IUCN Red List Categories

Prepared by the
IUCN Species Survival Commission
As approved by the
40th Meeting of the IUCN Council
Gland, Switzerland
30 November 1994

I) Introduction

1. The threatened species categories now used in Red Data Books and Red Lists have been in place, with some modification, for almost 30 years. Since their introduction these categories have become widely recognised internationally, and they are now used in a whole range of publications and listings, produced by IUCN as well as by numerous governmental and non-governmental organisations. The Red Data Book categories provide an easily and widely understood method for highlighting those species under higher extinction risk, so as to focus attention on conservation measures designed to protect them.

2. The need to revise the categories has been recognised for some time. In 1984, the SSC held a symposium, 'The Road to Extinction' (Fitter & Fitter 1987), which examined the issues in some detail, and at which a number of options were considered for the revised system. However, no single proposal resulted. The current phase of development began in 1989 with a request from the SSC Steering Committee to develop a new approach that would provide the conservation community with useful information for action planning.

In this document, proposals for new definitions for Red List categories are presented. The general aim of the new system is to provide an explicit, objective framework for the classification of species according to their extinction risk.

The revision has several specific aims:

- To provide a system that can be applied consistently by different people;
- To improve the objectivity by providing those using the criteria with clear guidance on how to evaluate different factors which affect risk of extinction;
- To provide a system which will facilitate comparisons across widely different taxa;

- To give people using threatened species lists a better understanding of how individual species were classified.

3. The proposals presented in this document result from a continuing process of drafting, consultation and validation. It was clear that the production of a large number of draft proposals led to some confusion, especially as each draft has been used for classifying some set of species for conservation purposes. To clarify matters, and to open the way for modifications as and when they became necessary, a system for version numbering was applied as follows:

- Version 1.0: Mace & Lande (1991)

The first paper discussing a new basis for the categories, and presenting numerical criteria especially relevant for large vertebrates.

- Version 2.0: Mace *et al.* (1992)

A major revision of Version 1.0, including numerical criteria appropriate to all organisms and introducing the non-threatened categories.

- Version 2.1: IUCN (1993)

Following an extensive consultation process within SSC, a number of changes were made to the details of the criteria, and fuller explanation of basic principles was included. A more explicit structure clarified the significance of the non-threatened categories.

- Version 2.2: Mace & Stuart (1994)

Following further comments received and additional validation exercises, some minor changes to the criteria were made. In addition, the Susceptible category present in Versions 2.0 and 2.1 was subsumed into the Vulnerable category. A precautionary application of the system was emphasised.

- Final Version

This final document, which incorporates changes as a result of comments from IUCN members, was adopted by the IUCN Council in December 1994.

All future taxon lists including categorisa-

tions should be based on this version, and not the previous ones.

4. In the rest of this document the proposed system is outlined in several sections. The Preamble presents some basic information about the context and structure of the proposal, and the procedures that are to be followed in applying the definitions to species. This is followed by a section giving definitions of terms used. Finally the definitions are presented, followed by the quantitative criteria used for classification within the threatened categories. It is important for the effective functioning of the new system that all sections are read and understood, and the guidelines followed.

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II) Preamble

The following points present important information on the use and interpretation of the categories (= Critically Endangered, Endangered, etc.), criteria (= A to E), and sub-criteria (= a,b etc., i,ii etc.):

1. Taxonomic Level and Scope of the Categorisation Process

The criteria can be applied to any taxonomic unit at or below the species level. The term 'taxon' in the following notes, definitions and criteria is used for conven-

ience, and may represent species or lower taxonomic levels, including forms that are not yet formally described. There is a sufficient range among the different criteria to enable the appropriate listing of taxa from the complete taxonomic spectrum, with the exception of micro-organisms. The criteria may also be applied within any specified geographical or political area although in such cases special notice should be taken of point 11 below. In presenting the results of applying the criteria, the taxonomic unit and area under consideration should be made explicit. The categorisation process should only be applied to wild populations inside their natural range, and to populations resulting from benign introductions (defined in the draft IUCN Guidelines for Re-introductions as "...an attempt to establish a species, for the purpose of conservation, outside its recorded distribution, but within an appropriate habitat and eco-geographical area").

2. Nature of the Categories

All taxa listed as Critically Endangered qualify for Vulnerable and Endangered, and all listed as Endangered qualify for Vulnerable. Together these categories are described as 'threatened'. The threatened species categories form a part of the overall scheme. It will be possible to place all taxa into one of the categories (see Figure 1).

3. Role of the Different Criteria

For listing as Critically Endangered, Endan-

gered or Vulnerable there is a range of quantitative criteria; meeting any one of these criteria qualifies a taxon for listing at that level of threat. Each species should be evaluated against all the criteria. The different criteria (A-E) are derived from a wide review aimed at detecting risk factors across the broad range of organisms and the diverse life histories they exhibit. Even though some criteria will be inappropriate for certain taxa (some taxa will never qualify under these however close to extinction they come), there should be criteria appropriate for assessing threat levels for any taxon (other than micro-organisms). The relevant factor is whether any one criterion is met, not whether all are appropriate or all are met. Because it will never be clear which criteria are appropriate for a particular species in advance, each species should be evaluated against all the criteria, and any criterion met should be listed.

4. Derivation of Quantitative Criteria

The quantitative values presented in the various criteria associated with threatened categories were developed through wide consultation and they are set at what are generally judged to be appropriate levels, even if no formal justification for these values exists. The levels for different criteria within categories were set independently but against a common standard. Some broad consistency between them was sought. However, a given taxon should not be expected to meet all criteria (A-E) in a category; meeting any one criterion is suf-

ficient for listing.

5. Implications of Listing

Listing in the categories of Not Evaluated and Data Deficient indicates that no assessment of extinction risk has been made, though for different reasons. Until such time as an assessment is made, species listed in these categories should not be treated as if they were non-threatened, and it may be appropriate (especially for Data Deficient forms) to give them the same degree of protection as threatened taxa, at least until their status can be evaluated.

Extinction is assumed here to be a chance process. Thus, a listing in a higher extinction risk category implies a higher expectation of extinction, and over the timeframes specified more taxa listed in a higher category are expected to go extinct than in a lower one (without effective conservation action). However, the persistence of some taxa in high risk categories does not necessarily mean their initial assessment was inaccurate.

6. Data Quality and the Importance of Inference and Projection

The criteria are clearly quantitative in nature. However, the absence of high quality data should not deter attempts at applying the criteria, as methods involving estimation, inference and projection are emphasised to be acceptable throughout. Inference and projection may be based on extrapo-

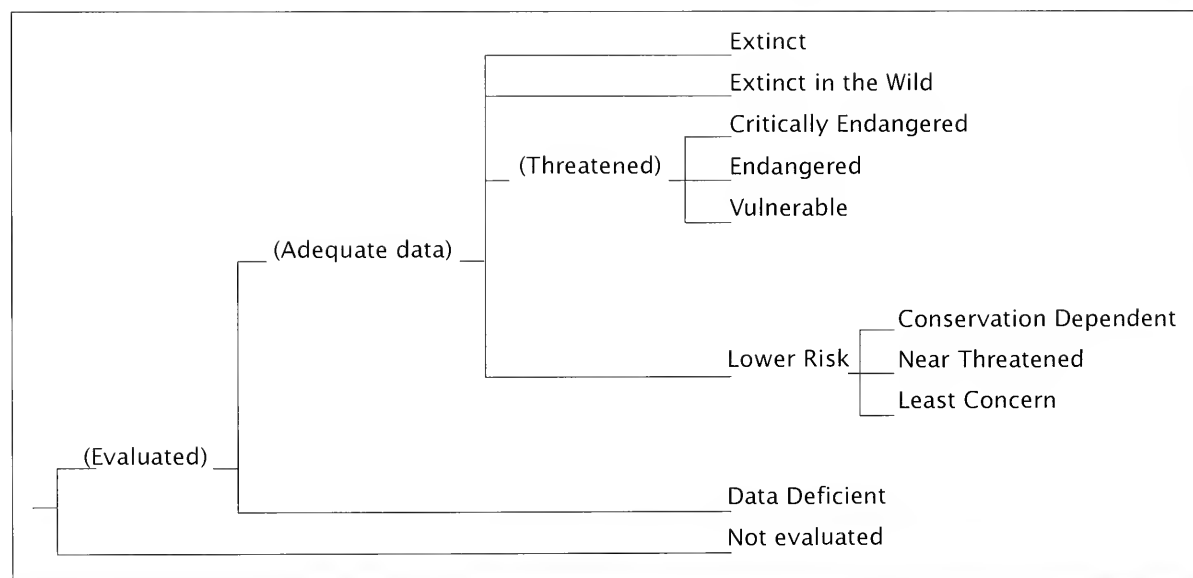


Figure 1: Structure of Categories.

lation of current or potential threats into the future (including their rate of change), or of factors related to population abundance or distribution (including dependence on other taxa), so long as these can reasonably be supported. Suspected or inferred patterns in either the recent past, present or near future can be based on any of a series of related factors, and these factors should be specified.

Taxa at risk from threats posed by future events of low probability but with severe consequences (catastrophes) should be identified by the criteria (e.g. small distributions, few locations). Some threats need to be identified particularly early, and appropriate actions taken, because their effects are irreversible, or nearly so (pathogens, invasive organisms, hybridization).

7. Uncertainty

The criteria should be applied on the basis of the available evidence on taxon numbers, trend and distribution, making due allowance for statistical and other uncertainties. Given that data are rarely available for the whole range or population of a taxon, it may often be appropriate to use the information that is available to make intelligent inferences about the overall status of the taxon in question. In cases where a wide variation in estimates is found, it is legitimate to apply the precautionary principle and use the estimate (providing it is credible) that leads to listing in the category of highest risk.

Where data are insufficient to assign a category (including Lower Risk), the category of 'Data Deficient' may be assigned. However, it is important to recognise that this category indicates that data are inadequate to determine the degree of threat faced by a taxon, not necessarily that the taxon is poorly known. In cases where there are evident threats to a taxon through, for example, deterioration of its only known habitat, it is important to attempt threatened listing, even though there may be little direct information on the biological status of the taxon itself. The category 'Data Deficient' is not a threatened category, although it indicates a need to obtain more information on a taxon to determine the appropriate listing.

8. Conservation Actions in the Listing Process

The criteria for the threatened categories are to be applied to a taxon whatever the

level of conservation action affecting it. In cases where it is only conservation action that prevents the taxon from meeting the threatened criteria, the designation of 'Conservation Dependent' is appropriate. It is important to emphasise here that a taxon require conservation action even if it is not listed as threatened.

9. Documentation

All taxon lists including categorisation resulting from these criteria should state the criteria and sub-criteria that were met. No listing can be accepted as valid unless at least one criterion is given. If more than one criterion or sub-criterion was met, then each should be listed. However, failure to mention a criterion should not necessarily imply that it was not met. Therefore, if a re-evaluation indicates that the documented criterion is no longer met, this should not result in automatic down-listing. Instead, the taxon should be re-evaluated with respect to all criteria to indicate its status. The factors responsible for triggering the criteria, especially where inference and projection are used, should at least be logged by the evaluator, even if they cannot be included in published lists.

10. Threats and Priorities

The category of threat is not necessarily sufficient to determine priorities for conservation action. The category of threat simply provides an assessment of the likelihood of extinction under current circumstances, whereas a system for assessing priorities for action will include numerous other factors concerning conservation action such as costs, logistics, chances of success, and even perhaps the taxonomic distinctiveness of the subject.

11. Use at Regional Level

The criteria are most appropriately applied to whole taxa at a global scale, rather than to those units defined by regional or national boundaries. Regionally or nationally based threat categories, which are aimed at including taxa that are threatened at regional or national levels (but not necessarily throughout their global ranges), are best used with two key pieces of information: the global status category for the taxon, and the proportion of the global population or range that occurs within the region or nation. However, if applied at regional or national level it must be recognised that a global category of threat may not be the same as a regional or national category for a par-

ticular taxon. For example, taxa classified as Vulnerable on the basis of their global declines in numbers or range might be Lower Risk within a particular region where their populations are stable. Conversely, taxa classified as Lower Risk globally might be Critically Endangered within a particular region where numbers are very small or declining, perhaps only because they are at the margins of their global range. IUCN is still in the process of developing guidelines for the use of national red list categories.

12. Re-evaluation

Evaluation of taxa against the criteria should be carried out at appropriate intervals. This is especially important for taxa listed under Near Threatened, or Conservation Dependent, and for threatened species whose status is known or suspected to be deteriorating.

13. Transfer Between Categories

There are rules to govern the movement of taxa between categories. These are as follows: (A) A taxon may be moved from a category of higher threat to a category of lower threat if none of the criteria of the higher category has been met for five years or more. (B) If the original classification is found to have been erroneous, the taxon may be transferred to the appropriate category or removed from the threatened categories altogether, without delay (but see Section 9). (C) Transfer from categories of lower to higher risk should be made without delay.

14. Problems of Scale

Classification based on the sizes of geographic ranges or the patterns of habitat occupancy is complicated by problems of spatial scale. The finer the scale at which the distributions or habitats of taxa are mapped, the smaller the area will be that they are found to occupy. Mapping at finer scales reveals more areas in which the taxon is unrecorded. It is impossible to provide any strict but general rules for mapping taxa or habitats; the most appropriate scale will depend on the taxa in question, and the origin and comprehensiveness of the distributional data. However, the thresholds for some criteria (e.g. Critically Endangered) necessitate mapping at a fine scale.

III) Definitions

1. Population

Population is defined as the total number of individuals of the taxon. For functional reasons, primarily owing to differences between life-forms, population numbers are expressed as numbers of mature individuals only. In the case of taxa obligately dependent on other taxa for all or part of their life cycles, biologically appropriate values for the host taxon should be used.

2. Subpopulations

Subpopulations are defined as geographically or otherwise distinct groups in the population between which there is little exchange (typically one successful migrant individual or gamete per year or less).

3. Mature Individuals

The number of mature individuals is defined as the number of individuals known, estimated or inferred to be capable of reproduction. When estimating this quantity the following points should be borne in mind:

- Where the population is characterised by natural fluctuations the minimum number should be used.
- This measure is intended to count individuals capable of reproduction and should therefore exclude individuals that are environmentally, behaviourally or otherwise reproductively suppressed in the wild.
- In the case of populations with biased adult or breeding sex ratios it is appropriate to use lower estimates for the number of mature individuals which take this into account (e.g. the estimated effective population size).
- Reproducing units within a clone should be counted as individuals, except where such units are unable to survive alone (e.g. corals).
- In the case of taxa that naturally lose all or a subset of mature individuals at some point in their life cycle, the estimate should be made at the appropriate time, when mature individuals are available for breeding.

4. Generation

Generation may be measured as the average age of parents in the population. This is greater than the age at first breeding, except in taxa where individuals breed only once.

5. Continuing Decline

A continuing decline is a recent, current or projected future decline whose causes are not known or not adequately controlled and so is liable to continue unless remedial measures are taken. Natural fluctuations will not normally count as a continuing decline, but an observed decline should not be considered to be part of a natural fluctuation unless there is evidence for this.

6. Reduction

A reduction (criterion A) is a decline in the number of mature individuals of at least

the amount (%) stated over the time period (years) specified, although the decline need not still be continuing. A reduction should not be interpreted as part of a natural fluctuation unless there is good evidence for this. Downward trends that are part of natural fluctuations will not normally count as a reduction.

7. Extreme Fluctuations

Extreme fluctuations occur in a number of taxa where population size or distribution area varies widely, rapidly and frequently, typically with a variation greater than one order of magnitude (i.e., a tenfold increase

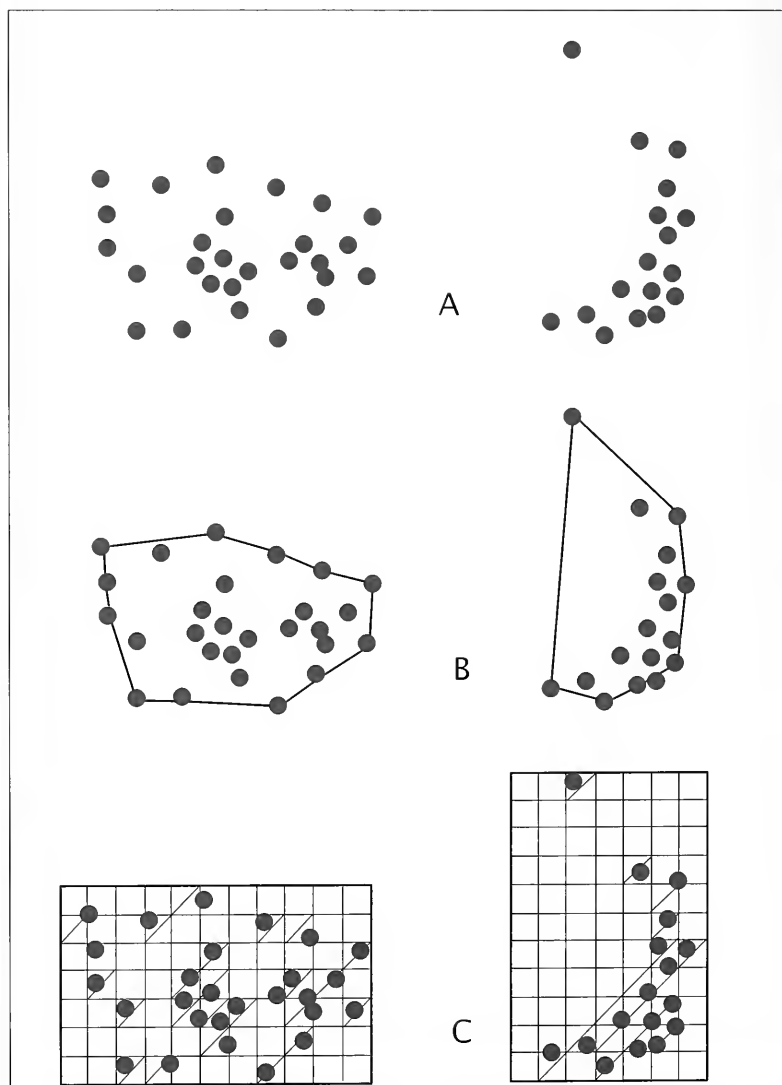


Figure 2: Two examples of the distinction between extent of occurrence and area of occupancy. (A) is the spatial distribution of known, inferred or projected sites of occurrence. (B) shows one possible boundary to the extent of occurrence, which is the measured area within this boundary. (C) shows one measure of area of occupancy which can be measured by the sum of the occupied grid squares.

or decrease).

8. *Severely Fragmented*

Severely fragmented refers to the situation where increased extinction risks to the taxon result from the fact that most individuals within a taxon are found in small and relatively isolated subpopulations. These small subpopulations may go extinct, with a reduced probability of recolonisation.

9. *Extent of Occurrence*

Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon, excluding cases of vagrancy. This measure may exclude discontinuities or disjunctions within the overall distributions of taxa (e.g., large areas of obviously unsuitable habitat) (but see 'area of occupancy'). Extent of occurrence can often be measured by a minimum convex polygon (the smallest polygon in which no internal angle exceeds 180 degrees and which contains all the sites of occurrence).

10. *Area of Occupancy*

Area of occupancy is defined as the area within its 'extent of occurrence' (see definition) which is occupied by a taxon, excluding cases of vagrancy. The measure reflects the fact that a taxon will not usually occur throughout the area of its extent of occurrence, which may, for example, contain unsuitable habitats. The area of occupancy is the smallest area essential at any stage to the survival of existing populations of a taxon (e.g. colonial nesting sites, feeding sites for migratory taxa). The size of the area of occupancy will be a function of the scale at which it is measured, and should be at a scale appropriate to relevant biological aspects of the taxon. The criteria include values in km², and thus to avoid errors in classification, the area of occupancy should be measured on grid squares (or equivalents) which are sufficiently small (see Figure 2).

11. *Location*

Location defines a geographically or ecologically distinct area in which a single event (e.g. pollution) will soon affect all individuals of the taxon present. A location usually,

but not always, contains all or part of a subpopulation of the taxon, and is typically a small proportion of the taxon's total distribution.

12. *Quantitative Analysis*

A quantitative analysis is defined here as the technique of population viability analysis (PVA), or any other quantitative form of analysis, which estimates the extinction probability of a taxon or population based on the known life history and specified management or non-management options. In presenting the results of quantitative analyses the structural equations and the data should be explicit.

IV) The Categories¹

EXTINCT (EX)

A taxon is Extinct when there is no reasonable doubt that the last individual has died.

EXTINCT IN THE WILD (EW)

A taxon is Extinct in the wild when it is known only to survive in cultivation, in captivity or as a naturalised population (or populations) well outside the past range. A taxon is presumed extinct in the wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the criteria (A to E) on pages 13 and 14.

ENDANGERED (EN)

A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future, as defined by any of the criteria (A to E) on pages 14 and 15.

VULNERABLE (VU)

A taxon is Vulnerable when it is not Criti-

cally Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future, as defined by any of the criteria (A to E) on pages 15 and 16.

LOWER RISK (LR)

A taxon is Lower Risk when it has been evaluated, does not satisfy the criteria for any of the categories Critically Endangered, Endangered or Vulnerable. Taxa included in the Lower Risk category can be separated into three subcategories:

1. **Conservation Dependent (cd).** Taxa which are the focus of a continuing taxon-specific or habitat-specific conservation programme targeted towards the taxon in question, the cessation of which would result in the taxon qualifying for one of the threatened categories above within a period of five years.
2. **Near Threatened (nt).** Taxa which do not qualify for Conservation Dependent, but which are close to qualifying for Vulnerable.
3. **Least Concern (lc).** Taxa which do not qualify for Conservation Dependent or Near Threatened.

DATA DEFICIENT (DD)

A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution is lacking. Data Deficient is therefore not a category of threat or Lower Risk. Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and threatened status. If the range of a taxon is suspected to be relatively circumscribed, if a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

NOT EVALUATED (NE)

A taxon is Not Evaluated when it has not yet been assessed against the criteria.

¹ Note: As in previous IUCN categories, the abbreviation of each category (in parenthesis) follows the English denominations when translated into other languages.

V) The Criteria for Critically Endangered, Endangered and Vulnerable

CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when it is facing an extremely high risk of extinction in the wild in the immediate future, as defined by any of the following criteria (A to E):

A) Population reduction in the form of either of the following:

1) An observed, estimated, inferred or suspected reduction of at least 80% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:

- a) direct observation
- b) an index of abundance appropriate for the taxon
- c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
- d) actual or potential levels of exploitation
- e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.

2) A reduction of at least 80%, projected or suspected to be met within the next 10 years or three generations, whichever is the longer, based on (and specifying) any of (b), (c), (d) or (e) above.

B) Extent of occurrence estimated to be less than 100 km² or area of occupancy estimated to be less than 10 km², and estimates indicating any two of the following:

1) Severely fragmented or known to exist at only a single location.

2) Continuing decline, observed, inferred or projected, in any of the following:

- a) extent of occurrence
- b) area of occupancy
- c) area, extent and/or quality of habitat
- d) number of locations or subpopulations
- e) number of mature individuals.

3) Extreme fluctuations in any of the following:

- a) extent of occurrence
- b) area of occupancy
- c) number of locations or subpopulations
- d) number of mature individuals.

C) Population estimated to number less than 250 mature individuals and either:

1) An estimated continuing decline

of at least 25% within three years or one generation, whichever is longer or

2) A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:

a) severely fragmented (i.e. no subpopulation estimated to contain more than 50 mature individuals)

b) all individuals are in a single subpopulation.

D) Population estimated to number less than 50 mature individuals.

E) Quantitative analysis showing the probability of extinction in the wild is at least 50% within 10 years or three generations, whichever is the longer.

ENDANGERED (EN)

A taxon is Endangered when it is not Critically Endangered but is facing a very high risk of extinction in the wild in the near future, as defined by any of the following criteria (A to E):

A) Population reduction in the form of either of the following:

1) An observed, estimated, inferred or suspected reduction of at least 50% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:

- a) direct observation
- b) an index of abundance appropriate for the taxon
- c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
- d) actual or potential levels of exploitation
- e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.

2) A reduction of at least 50%, projected or suspected to be met within the next 10 years or three generations, whichever is the longer, based on (and specifying) any of (b), (c), (d), or (e) above.

B) Extent of occurrence estimated to be less than 5,000 km² or area of occupancy estimated to be less than 500 km², and estimates indicating any two of the following:

1) Severely fragmented or known to exist at no more than five locations.

2) Continuing decline, inferred, observed or projected, in any of the following:

- a) extent of occurrence

b) area of occupancy

c) area, extent and/or quality of habitat

d) number of locations or subpopulations

e) number of mature individuals.

3) Extreme fluctuations in any of the following:

- a) extent of occurrence
- b) area of occupancy
- c) number of locations or subpopulations
- d) number of mature individuals.

C) Population estimated to number less than 2,500 mature individuals and either:

1) An estimated continuing decline of at least 20% within five years or two generations, whichever is longer, or

2) A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:

a) severely fragmented (i.e. no subpopulation estimated to contain more than 250 mature individuals)

b) all individuals are in a single subpopulation.

D) Population estimated to number less than 250 mature individuals.

E) Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or five generations, whichever is the longer.

VULNERABLE (VU)

A taxon is Vulnerable when it is not Critically Endangered or Endangered but is facing a high risk of extinction in the wild in the medium-term future, as defined by any of the following criteria (A to E):

A) Population reduction in the form of either of the following:

1) An observed, estimated, inferred or suspected reduction of at least 20% over the last 10 years or three generations, whichever is the longer, based on (and specifying) any of the following:

- a) direct observation
- b) an index of abundance appropriate for the taxon
- c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
- d) actual or potential levels of exploitation
- e) the effects of introduced taxa, hybridisation, pathogens, pollutants, competitors or parasites.

- 2) A reduction of at least 20%, projected or suspected to be met within the next ten years or three generations, whichever is the longer, based on (and specifying) any of (b), (c), (d) or (e) above.
- B) Extent of occurrence estimated to be less than 20,000 km² or area of occupancy estimated to be less than 2,000 km², and estimates indicating any two of the following:
- 1) Severely fragmented or known to exist at no more than ten locations.
 - 2) Continuing decline, inferred, observed or projected, in any of the following:
 - a) extent of occurrence
 - b) area of occupancy
 - c) area, extent and/or quality of habitat
 - d) number of locations or subpopulations
 - e) number of mature individuals

- 3) Extreme fluctuations in any of the following:
 - a) extent of occurrence
 - b) area of occupancy
 - c) number of locations or subpopulations
 - d) number of mature individuals
- C) Population estimated to number less than 10,000 mature individuals and either:
 - 1) An estimated continuing decline of at least 10% within 10 years or three generations, whichever is longer, or
 - 2) A continuing decline, observed, projected, or inferred, in numbers of mature individuals and population structure in the form of either:
 - a) severely fragmented (i.e. no subpopulation estimated to contain more than 1,000 mature individuals)

- b) all individuals are in a single subpopulation
- D) Population very small or restricted in the form of either of the following:
 - 1) Population estimated to number less than 1,000 mature individuals.
 - 2) Population is characterised by an acute restriction in its area of occupancy (typically less than 100 km²) or in the number of locations (typically less than five). Such a taxon would thus be prone to the effects of human activities (or stochastic events whose impact is increased by human activities) within a very short period of time in an unforeseeable future, and is thus capable of becoming Critically Endangered or even Extinct in a very short period.
- E) Quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years.

APPENDIX 2

1994 Categorias da Lista Vermelha da IUCN

DOCUMENTO ELABORADO PELA
Species Survival Commission - SSC DA IUCN
APROVADO NA 40ª REUNIÃO DO CONSELHO DA IUCN
GLAND, SUÍÇA
30 de novembro de 1994

I. INTRODUÇÃO

1. As categorias de espécies ameaçadas atualmente em uso no Livros Vermelhos e nas Listas Vermelhas têm sido mantidas, com algumas modificações, por quase trinta anos. Desde o início, estas categorias tem se tornado amplamente reconhecidas e usadas em todas as publicações e listas produzidas pela IUCN, bem como por numerosas organizações governamentais e não governamentais. As categorias do Livro Vermelho fornecem um método fácil e de grande compreensão para destacar as espécies que se encontram em alto risco de extinção, uma vez que concentram a atenção para as medidas de conservação traçadas para a proteção das espécies.

2. A necessidade de revisão das categorias tem sido reconhecida há algum tempo. Em 1984, Species Survival Commission - SSC realizou um simpósio, "O caminho da Extinção" (Fitter & Fitter 1987), no qual a

questão foi examinada em detalhe e consideradas várias opções para a revisão do sistema. No entanto, não se obteve uma única proposta. A fase atual do desenvolvimento teve início em 1989 (ou 1987?) com uma solicitação do Steering Committee da SSC para desenvolver uma nova abordagem que poderá proporcionar à comunidade conservacionista informações úteis para os planos de ação.

Neste documento são apresentadas propostas para novas definições das categorias do Livro Vermelho. O objetivo geral do novo sistema é prover um modo explícito e objetivo para a classificação das espécies de acordo com seu risco de extinção.

A revisão apresenta vários objetivos específicos:

- Fornecer um sistema que possa ser aplicado de modo consistente por diferentes pessoas;
- Tornar mais objetivos os critérios usa-

dos, mediante a orientação clara sobre o modo de avaliar diferentes fatores que afetam o risco de extinção;

- Fornecer um sistema que facilite comparações em taxa completamente diferentes;
- Proporcionar ao público que utiliza listas de espécies ameaçadas de extinção um melhor entendimento de como são classificadas as diferentes espécies.

3. As propostas apresentadas neste documento são o resultado de um contínuo processo de tentativas, consulta e validação de propostas. Estava claro que a produção de um grande número de propostas preliminares levaram a alguma confusão, especialmente porque cada tentativa estava sendo usada para classificar alguns grupos de espécies com a finalidade de conservação. Para esclarecer o assunto e permitir futuras modificações, quando e onde se tornarem necessárias, foi aplicado um sistema de numeração das versões da seguinte maneira:

- Versão 1.0: Mace & Lande (1991)
O primeiro documento que discute uma nova base para as categorias e apresenta critérios numéricos especialmente relevante para os grandes vertebrados.
- Versão 2.0: Mace et al. (1992)
Uma revisão mais aprofundada da Versão 1.0, incluindo critérios numéricos apropriados a todos os organismos, além de incluir as categorias Não Ameaçadas.
- Versão 2.1: IUCN (1993)
Seguindo um extenso processo de consultas ao SSC, foram feitos uma série de modificações para detalhar os critérios e a inclusão de uma explanação completa dos princípios básicos. Uma estrutura mais explícita esclareceu o significado de categorias Não Ameaçadas.
- Versão 2.2: Mace & Stuart (1994)
Considerando os comentários adicionais recebidos e os exercícios de validação, foram feitas pequenas modificações nos critérios. Além disso, a categoria Suscetível apresentada na Versão 2.0 e 2.1 foi incluída na categoria Vulnerável. Foi enfatizado que o sistema deve ser aplicado com precaução.
- Versão Final
O documento final, o qual incorpora mudanças resultantes dos comentários dos membros da IUCN, foi adotado pelo Conselho da IUCN em dezembro de 1994.

Todas as futuras listas de taxa que incluam a disposição em categorias devem ser baseadas nesta versão, e não nas anteriores.

4. No restante deste documento, o sistema proposto é dividido em várias seções. O Preâmbulo apresenta informações básicas sobre o contexto e a estrutura da proposta, bem como os procedimentos a serem seguidos na aplicação das definições às espécies. Ao preâmbulo, seguem-se as definições dos termos usados. Finalmente, são apresentadas as definições, seguidas dos critérios quantitativos usados na classificação dentro das categorias ameaçadas. Para a efetiva funcionalidade do novo sistema, é importante que todas as seções sejam lidas e compreendidas e seguidas as orientações.

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II. PREÂMBULO

Os tópicos abaixo apresentam importantes informações para o uso e interpretação das categorias (=Em Perigo Crítico, Em Perigo, etc), critérios (=A a E), e subcritérios (=a, b etc., i, ii etc.):

1. Nível Taxonômico e Escopo do Processo de Categorização

Os critérios podem ser aplicados a qualquer unidade taxonômica em nível de espécie ou abaixo desta. Por questão de conveniência, o termo "táxon" é usado, nas notas, definições e critérios seguintes, e pode representar espécies ou níveis taxonômicos inferiores, incluindo formas que não estão ainda formalmente descritas. Há suficiente amplitude entre os diferentes critérios de modo a permitir uma listagem completa de taxa de todo o espectro taxonômico, com exceção dos microorganismos. Os critérios podem também ser aplicados dentro de qualquer área geográfica ou política específica, embora em tais casos deva ser dada atenção especial ao item 11 abaixo. Na apresentação dos resultados da aplicação dos critérios, devem ser explicitadas a unidade taxonômica e a área considerada. O processo de categorização só deve ser aplicado a populações silvestres no âmbito da sua distribuição natural e às populações que resultaram de introduções benígnas (definidas na mi-

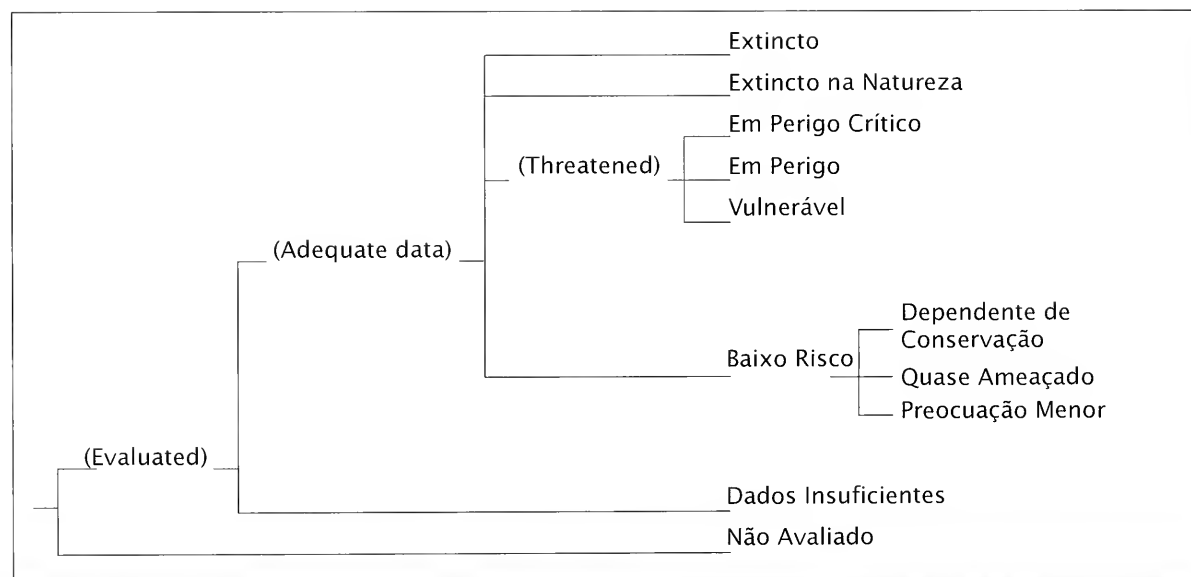


Figura 1: Structuro des categorias.

nuta “Diretrizes para Reintroduções como ...uma tentativa de fixar uma espécie, com propósitos conservacionistas, fora dos locais de distribuição registrados, porém dentro de um habitat e área ecogeográfica apropriada”).

2. Natureza das Categorias

Todos os taxa listados como Em Perigo Crítico também podem ser classificados como Vulnerável ou Em Perigo, e todos os taxa registrados como Em Perigo também podem ser qualificados como Vulnerável. Juntas, estas categorias são descritas como Ameaçadas. As categorias de espécies ameaçadas formam uma parte do esquema global. É possível classificar todos os taxa em pelo menos uma das categorias (ver Figura 1).

3. Papel dos Diferentes Critérios

Para que se possa listar um táxon com Em Perigo Crítico, Em Perigo ou Vulnerável existe uma série de critérios quantitativos; o atendimento de qualquer desses critérios qualifica um táxon para ser listado no nível ameaçado. Cada espécie deve ser avaliada tendo em conta todos os critérios. Os diferentes critérios (A - E) são derivados de uma ampla revisão, com a qual se pretendia detectar os fatores de risco comuns a uma ampla variedade de organismos e à diversidade de formas de vida que eles apresentam. Ainda assim, alguns critérios se mostrarão inapropriados para certos taxa (alguns taxa nunca serão enquadrados nesses critérios, por mais que se encontrem próximos da extinção), deveriam existir critérios apropriados para avaliar os níveis de ameaça para qualquer táxon (exceto os microorganismos). O fator relevante quando se inclui uma espécie em uma lista é se um critério qualquer é atendido, e não se todos são apropriados ou todos são atendidos. Dado que nunca ficará claro de antemão qual será o critério apropriado a uma espécie em particular, cada espécie deverá ser avaliada seguindo todos os critérios, e todo(s) aquele(s) que se se ajustem à espécie deverão ser mencionados.

4. Derivação dos Critérios Quantitativos

Os valores quantitativos apresentados para os vários critérios associados com as categorias ameaçadas foram desenvolvidos por meio de ampla consulta e têm sido estabelecidos em níveis julgados apropriados, mesmo quando não existe justificativa formal para esses valores. Os

níveis para os diferentes critérios, dentro de cada uma das categorias, foram estabelecidos independentemente, porém tendo em conta um padrão comum. Buscou-se a compatibilidade entre esses níveis, embora não seja esperado que um dado táxon deva ser enquadrado em todos os critérios (A - E) de uma categoria; o atendimento de um critério é suficiente para que a espécie seja classificada.

5. Implicações da Lista

Mesmo que por razões diferentes, o fato de se incluir espécies nas categorias Não Avaliado ou Dados Insuficientes indica que a avaliação sobre o risco de extinção não foi concluída. Até o momento em que a avaliação é concluída, as espécies incluídas nessas categorias não devem ser tratadas como sendo não ameaçadas, e seria apropriado (especialmente para as que figuram em Dados Insuficientes) o mesmo grau de proteção que é dado aos taxa ameaçados, pelo menos até que seu “status” possa ser elevado.

A extinção é aqui considerada como um processo probabilístico. Assim, incluir uma espécie numa categoria de alto risco de extinção implica numa maior expectativa de que a extinção ocorra e, no período de tempo especificado, se espera que mais taxa listados numa categoria mais alta sejam extintos do que os que estão em níveis inferiores (sem ações efetivas de conservação). No entanto, a permanência de alguns taxa em categorias de alto risco não significa necessariamente que sua avaliação inicial tenha sido incorreta.

6. Qualidade da Informação e Importância da Inferência e da Projeção

Os critérios são claramente de natureza quantitativa. No entanto, a ausência de informação de alta qualidade não devem ser motivo para se evitar a aplicação dos critérios, uma vez que os métodos envolvendo estimativas, inferências e projeções são aceitáveis ao longo de todo o processo. A inferência e a projeção podem ser baseadas na extrapolação futura das ameaças atuais ou potenciais (incluindo sua taxa de variação), ou em fatores relacionados com a abundância ou distribuição da população (incluindo sua dependência com outros taxa), na medida em que estes fatores possam ser razoavelmente justificados. Padrões supostos ou inferidos de passado recente, do presente ou do futuro próximo podem estar baseados em qualquer de uma

série de fatores relacionados e que deveriam am ser especificados.

Taxa em situação de perigo por ameaças de eventos futuros de baixa probabilidade mas de graves consequências (catástrofes) deveriam ser identificados pelos critérios (por ex. pequena distribuição, poucas localidades). Algumas ameaças necessitam ser identificadas precocemente, e adotadas as medidas apropriadas, pois os efeitos são irreversíveis, ou quase irreversíveis (patogênicos, organismos invasores, hibridação).

7. Incertezas

Os critérios devem ser aplicados com base em evidências disponíveis acerca do número, tendência e distribuição dos taxa considerando os erros estatísticos e de outros tipos. Uma vez que raramente se dispõe de informações para toda área de distribuição ou para toda população de um táxon, pode ser apropriada a utilização da informação disponível e a realização de inferências inteligentes sobre o status geral do táxon em questão. Nos casos em que se verifica uma ampla variação nas estimativas, é legítimo aplicar-se o princípio da prevenção e utilizar a estimativa (sempre que seja razoável) que conduza a uma inclusão na categoria de maior risco.

Quando os dados são insuficientes para que uma categoria (incluindo a de Menor Risco) seja adotada, a categoria Dados Insuficientes pode ser escolhida. Sem dúvida é importante reconhecer que esta categoria indica que os dados são inadequados para determinar o grau de ameaça a que está submetido um táxon, não implicando necessariamente que o táxon esteja pobremente estudado. No caso em que existem ameaças evidentes a um táxon, por exemplo, pela deterioração de seu único habitat conhecido, é importante tentar classificá-lo como ameaçado, mesmo que haja pouca informação direta sobre a condição biológica do táxon em si mesmo. A categoria Dados Insuficientes não é uma categoria de ameaça, ainda que indique a necessidade de obtenção de mais informação sobre um táxon para determinar uma classificação mais apropriada.

8. Ações de Conservação no Processo de Classificação

Os critérios para as categorias de ameaça existem para serem aplicados a um táxon, qualquer que seja o grau de ação que se esteja realizando. Nos casos em que as ações

de conservação em si mesmas são as que impedem que o táxon satisfaça os critérios de ameaça, a designação de “Conservação Dependente” é apropriada. É importante destacar o caso em que o táxon requer ação de conservação, mesmo quando não está classificado como ameaçado.

9. Documentação

Todos as listas de taxa que incluem categorização resultante desses critérios deveriam incluir quais são os critérios e subcritérios que foram preenchidos. Nenhuma inclusão em lista pode ser aceita como válida a não ser quando pelo menos um critério tenha sido preenchido. Se mais de um critério ou subcritério foi atendido, então cada um deles deve ser listado. Sem dúvida, o fato de um critério não ser mencionado não significa que ele não tenha sido atendido. Por isso, se uma reavaliação indica que o critério documentado não está sendo atendido, isto não deve resultar em sua automática eliminação. Ao contrário, o táxon deve ser reavaliado com respeito a todos os critérios de modo a indicar o seu status. Os fatores responsáveis pela determinação dos critérios, especialmente quando se utiliza a inferência e a projeção, devem ser pelo menos registrados pelo avaliador, mesmo quando não puderem ser incluídos nas listas publicadas.

10. Ameaças e Prioridades

A categoria de ameaça não é necessariamente suficiente para determinar prioridades para as ações de conservação. A categoria de ameaça simplesmente fornece uma avaliação da probabilidade de extinção nas circunstâncias atuais, considerando que um sistema para avaliação das prioridades incluirá numerosos fatores relacionados às ações de conservação, tais como custos, logísticas, possibilidades de êxito e talvez até mesmo a unidade sistemática do táxon.

11. Uso em Nível Regional

Os critérios são mais apropriadamente aplicados a taxa completos em escala global, do que aplicados a unidades definidas por limites regionais ou nacionais. Categorias de ameaça baseadas em informação em escala regional ou nacional, as quais têm como objeto a inclusão daqueles taxa que estão ameaçados em nível regional ou nacional (porém, não necessariamente toda sua distribuição mundial), são melhor utilizadas com dois elementos chaves de informação: a categoria do status global do

táxon e a proporção da população global ou a distribuição global que verifica dentro da região ou nação. No entanto, se aplicada ao nível regional ou nacional, deve ser aceito que uma categoria global de ameaça pode não ser a mesma que uma categoria regional ou nacional para um táxon em particular. Por exemplo, taxa classificados como Vulneráveis com base no declínio global na abundância (tamanho da população?) ou distribuição poderiam ser incluídas na categoria de Menor Risco numa região particular onde suas populações são estáveis. Ao contrário, taxa classificados como em Menor Risco podem estar em

Perigo Crítico dentro de uma região em particular, onde a população é pequena ou está em declínio, talvez somente porque eles se encontram nos limites marginais de sua distribuição global. A IUCN continua desenvolvendo diretrizes para o uso de categorias de listas vermelhas nacionais.

12. Reavaliação

A avaliação dos taxa em relação aos critérios deverá realizar-se em intervalos apropriados. Isto é especialmente importante para taxa listados como Quase Ameaçados ou Dependentes de Conservação, e para espé-

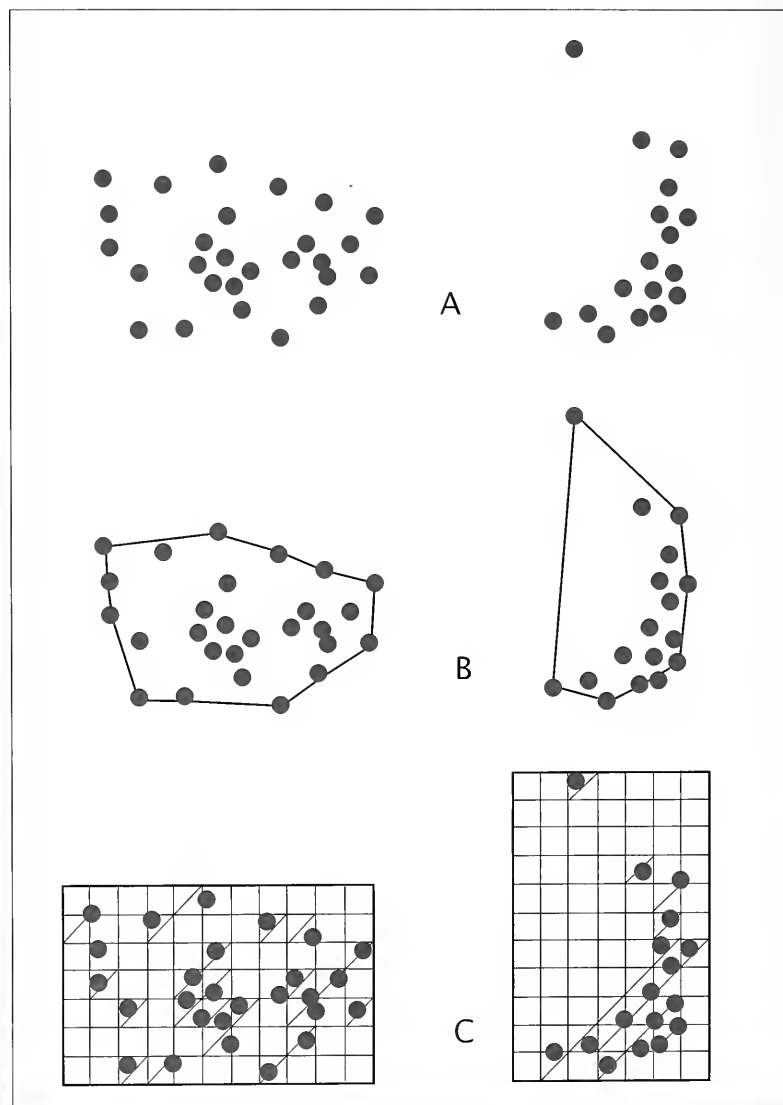


Figura 2. Dois exemplos das diferenças que permitem distinguir entre extensão de ocorrência e área de ocupação. Os pontos de (A) representam a distribuição espacial das localidades em que se encontra um táxon com base na observação, projeção ou inferência. Em (B) são mostrados os possíveis limites da extensão de ocorrência a qual é dada pela avaliação da superfície contidos em tais limites. Em (C) é mostrada uma medida da área de ocupação que pode ser avaliada como a soma dos quadrados da grade que estiverem ocupados.

cies ameaçadas cuja condição se sabe e ou supõe que esteja deteriorando.

13. Mudanças Entre Categorias

Existem regras que regem a mudança de taxa entre categorias. São elas: (A) Um táxon pode ser transferido de uma categoria de alta ameaça para outra menor se nenhum dos critérios da categoria mais alta for atendido por 5 anos ou mais. (B) Se a classificação original foi incorreta, o táxon pode ser transferido, sem demora, à categoria apropriada ou eliminado completamente das categorias de ameaça (ver por exemplo Seção 9). (C) A transferência das categorias de risco mais baixas para as mais altas devem ser feitas sem demora.

14. Problemas de Escala

A classificação baseada nos tamanhos de distribuição geográfica ou nos padrões de ocupação dos habitats se torna complicada por problemas de escala espacial. Quanto mais detalhada é a escala na qual são mapeadas as distribuições ou habitats dos taxa, menor será a área que se evidencia como ocupada. Mapear em escalas muito pequenas revela mais áreas em que o táxon não tem sido registrado. É impossível prover regras estritas, mas regras gerais para o mapeamento dos taxa ou habitats; a escala mais apropriada dependerá do táxon em questão, e a origem e a globalidade dos dados de distribuição. No entanto, para alguns critérios (por exemplo: Criticamente Ameaçado), os patamares(?) requerem a elaboração de mapas em escala pequena.

III. DEFINIÇÕES

1. População

População é definida como o número total de indivíduos de um táxon. Por razões funcionais, fundamentalmente devido às diferenças entre formas de vida, os números populacionais expressam somente os números de indivíduos maduros (adultos?). No caso de taxa que dependem obrigatoriamente de outro táxon para todo seu ciclo de vida ou parte dele, devem ser usados os valores biológicos apropriados para o táxon hospedeiro.

2. Subpopulações

Subpopulações são definidas como grupos distintos em uma população, seja geograficamente ou por outro critério, e nos quais ocorrem pequenos intercâmbios (tipica-

mente, um ou menos indivíduos ou gametas migratórios bem sucedidos, por ano ou menos).

3. Indivíduos Maduros

O número de indivíduos é definido como o número de indivíduos, quer seja conhecido, estimado ou inferido, capazes de reproduzir-se. Os seguintes pontos devem ser levados em conta ao se estimar esse número:

- Quando uma população é caracterizada por flutuações naturais, devem se usados os valores mínimos.
- Esta medida visa a contagem dos indivíduos capazes de reproduzir-se, e deve portanto excluir indivíduos que são impedidos de reproduzir-se em estado silvestre em virtude de causas ambientais, comportamentais ou outras.
- No caso de populações com desvios nas proporções de adultos ou sexos, é apropriado usar estimativas mais baixas para o número de indivíduos maduros que levam em conta esse desvio (por exemplo: o tamanho populacional efetivamente estimado).
- As unidades reprodutoras dentro de um mesmo clone devem ser consideradas como indivíduos, exceto quando essas unidades são incapazes de sobreviver sozinhas (por exemplo: corais).
- No caso de taxa que perdem naturalmente todos ou parte dos indivíduos maduros em algum momento do seu ciclo de vida, a estimativa deve ser feita no momento apropriado, quer dizer, quando os indivíduos maduros estão disponíveis para a reprodução.

4. Geração

Geração pode ser medida como a idade média dos progenitores na população. Esta é maior que a idade da primeira reprodução, exceto naqueles taxa em que os indivíduos só se reproduzem uma vez.

5. Declínio Contínuo

Um declínio contínuo é um declínio¹ contínuo recente, atual ou projetado para o futuro, cujas causas não são conhecidas ou não são adequadamente controladas e portanto tenderá continuar, a menos que se adotem medidas para remediar tais causas. As flutuações naturais normalmente não são consideradas declínio contínuo, mas quando se observa um declínio, este não

deve ser considerado parte de uma flutuação, a menos que haja evidência para considerá-lo como tal.

6. Redução

Uma redução (critério A) é um declínio no número de indivíduos maduros de pelo menos a quantidade (%) definida por período de tempo (anos) especificado, embora o declínio não necessariamente continue. Uma redução não deverá ser interpretada com parte de uma flutuação natural, a menos que exista boa evidência para tanto. Tendências decrescentes que são parte de flutuações naturais normalmente não são consideradas como reduções.

7. Flutuações Extremas

Flutuações extremas ocorrem em certos taxa para os quais o tamanho da população ou a área de distribuição varia ampla, rápida e frequentemente, tipicamente com uma variação maior de que uma ordem de magnitude (por exemplo: declínio ou incremento de dez vezes).

8. Severamente Fragmentado

Considera-se severamente fragmentada a situação em que os riscos de extinção para um táxon resultam do fato da maioria dos indivíduos em um táxon serem encontrados em subpopulações pequenas ou relativamente isoladas. Estas pequenas subpopulações podem chegar à extinção, com uma reduzida probabilidade de recolonização.

9. Extensão de Ocorrência

Extensão de ocorrência é definida como a área contida dentro dos menores limites contínuos e imaginários que podem delimitadas para abranger todos os lugares conhecidos, inferidos ou projetados, nos quais um táxon ocorre, excluindo-se os casos de deambulação. Esta medida pode excluir a descontinuidade ou disjunções dentro de uma distribuição geral dos taxa (por exemplo: grandes áreas de habitats claramente inviáveis) (ver, porém, área de ocupação). A extensão de ocorrência pode frequentemente ser medida por um polígono convexo mínimo (o menor polígono no qual nenhum ângulo interno ultrapasse 180 graus e que contenha todos os locais de ocorrência).

¹ No texto em espanhol são especificados os tipos de declínio, quais sejam: extensão da presença; área de ocupação; área, extensão e/ou qualidade do habitat; número de localidades ou subpopulações, número de indivíduos maduros.

10. Área de Ocupação

Área de ocupação é definida como a área dentro da sua 'extensão de ocorrência' (ver definição) que é ocupada por um táxon, excluindo os casos de A medida reflete o fato de que o táxon normalmente não ocorrerá de toda a sua extensão de ocorrência, já que esta pode conter habitats inviáveis. A área de ocupação é a menor área essencial para sobrevivência das populações existentes de um táxon, qualquer que seja o estágio de desenvolvimento (por exemplo: os lugares de nidificação de colônias, áreas de alimentação para taxa migratórios). O tamanho da área de ocupação será uma função da escala em que é medida, e deve efetuar-se em uma escala apropriada aos aspetos relevantes do táxon. Os critérios incluem valores em km² e, para que sejam evitados erros na classificação, a área de ocupação deve ser medida em quadrados de grade (ou equivalentes) que sejam suficientemente pequenas (ver Figura 2).

11. Localidade

Localidade é definida como uma área geográfica ou ecologicamente distinta na qual um simples evento (por exemplo: poluição) afetará prontamente todos os indivíduos do táxon ali presente. Normalmente mas nem sempre, uma localidade contém toda ou parte de uma subpopulação de táxon, e é tipicamente uma pequena proporção da distribuição total do táxon.

12. Análise Quantitativa

A análise quantitativa é definida como a técnica de análise da viabilidade populacional (PVA) ou qualquer outra forma de análise quantitativa em que é estimada a probabilidade de extinção de um táxon ou população, baseada no conhecimento do ciclo de vida e em opções especificadas, com ou sem manejo. Na apresentação dos resultados das análises quantitativas, as equações estruturais e os dados deverão ser explicitados.

IV. AS CATEGORIAS²

Extinto (EX)

Um táxon está Extinto quando não resta dúvida de que o último animal existente tenha morrido.

Extinto na Natureza (EW)

Um táxon está Extinto na Natureza quando somente sobrevive em cativeiro ou como população (ou populações) naturalizadas completamente fora de sua distribuição original. Um táxon está supostamente Extinto na natureza quando, pesquisas exaustivas realizadas em habitat conhecido e/ou esperado, em tempos apropriados (diário, sazonal, anual), e em toda a área tradicional de ocorrência não registrarem nenhum indivíduo. As pesquisas devem ser realizadas em períodos apropriados que estejam de acordo com o ciclo de vida e formas de vida do táxon.

Em Perigo Crítico (CR)

Um táxon está Em Perigo Crítico quando está enfrentando um risco extremamente grande de extinção na Natureza num futuro imediato, conforme definido por qualquer um dos critérios (A a E) mencionados nas 15, 16 e 17

Em Perigo (EN)

Um táxon está Ameaçado quando não está Em Perigo Crítico mas está enfrentando um alto risco de extinção na Natureza num futuro próximo, conforme definido por qualquer um dos critérios (A a E) mencionados nas páginas 17 e 18.

Vulnerável (VU)

Um táxon está vulnerável quando não está Em Perigo Crítico ou Em Perigo mas está enfrentando um alto risco de extinção na Natureza num futuro a médio prazo, conforme definido por qualquer um dos critérios (A a D) nas páginas 19, 20 e 21.

Baixo Risco (LR)

Um táxon é considerado com Baixo Risco quando, após avaliação, não satisfaz os critérios para nenhuma das categorias Em Perigo Crítico, Em Perigo, ou Vulnerável. Os Taxa incluídos nesta categoria podem ser divididos em três subcategorias:

1. Dependente de Conservação (cd). Taxa que são focos de um programa de conservação contínuo específico para o táxon ou para o habitat. A cessação desse programa resultaria, dentro de um período de cinco anos, na qualificação do táxon para uma das categorias mencionadas acima.

2. Quase Ameaçado (nt). Taxa que não qualificam-se como Dependente de Conservação, mas está próximo a ser qualificado com Vulneráveis.

3. Preocupação Menor (lc). Taxa que não se qualifica como Dependente de Conservação ou Quase Ameaçado

Dados Insuficientes (DD)

Um táxon é classificado na categoria Dados Insuficientes quando a informação é inadequada para se fazer uma avaliação direta ou indireta do risco de extinção, tendo por base a distribuição ou status da população. Um táxon dentro desta categoria pode estar bem estudado e sua biologia ser bem conhecida, mas faltarem dados apropriados sobre abundância e/ou distribuição. Dados Insuficientes não é, portanto uma categoria de ameaça ou de Menor Risco. Ao incluir um táxon nesta categoria, indica-se que mais informações são requeridas e se reconhece a possibilidade de que pesquisas futuras mostrem que uma classificação de ameaçada é apropriada. É importante fazer um uso real de todos os dados disponíveis. Em muitos casos deve-se ter bastante cuidado ao escolher entre DD e a condição de ameaçado. A suposição de que a distribuição de um táxon está relativamente circunscrita, e que transcorreu um período de tempo considerável desde o último registro do táxon, pode justificar a condição de ameaçado.

Não Avaliado (NE)

Um táxon é considerado não avaliado quando ainda não sofreu qualquer avaliação em relação a esses critérios.

V. OS CRITÉRIOS PARA AS CATEGORIAS EM PERIGO CRÍTICO, EM PERIGO E VULNERÁVEL

Em Perigo Crítico (CR)

Um táxon encontra-se em Perigo Crítico quando enfrenta, em futuro imediato, um risco extremamente grande de extinção na natureza, conforme definido por qualquer dos seguintes critérios (A a E).

- A. Redução da população por qualquer das seguintes formas:

1. Uma redução observada, estimada, inferida ou suposta em pelo menos 80% durante os últimos 10 anos ou 3 gerações, selecionando a maior delas, baseada em qualquer dos

² Nota: Como nas categorias anteriores da IUCN, a abreviatura de cada categoria (em parênteses) segue a denominação em inglês quando traduzido para outras línguas.

Tabela 2. Borrador das categorias da lista vermelha da IUCN—fevereiro de 1994.

Qualquer dos seguintes critérios podem ser usados para determinar categorias	Em Perigo Crítico	Em Perigo	Vulnerável
Redução da população	Redução 80% nos últimos 10 anos com base na:	Redução de 50% nos últimos 10 anos ou 2 gerações com base na:	Redução 50% nos últimos 20 anos ou 5 gerações com base na:
	a) observação direta ou b) redução na área ocupada, distribuição e/ou qualidade do habitat ou c) níveis reais ou potenciais de exploração ou d) efeitos da taxa de introdução, hibridação, elementos patogênicos, poluentes, competidores ou parasitas.		
	ou Redução 80% /10 anos	ou Redução 50% em 10 anos ou 2 gerações, prevista para um futuro próximo	ou Redução 50% em 20 anos ou 5 gerações, prevista para um futuro próximo
Range de distribuição	Estimativa < 100Km² ou área de ocupação estimada < 10Km², e dois dos seguintes:	Estimativa < 5,000Km² ou área de ocupação estimada < 500Km² e dois dos seguintes:	Estimativa < 20,000Km² ou área de ocupação estimada < 2,000Km², e dois dos seguintes:
	Seramente fragmentada ou em uma só localidade	Seramente fragmentada ou em 5 localidades ou menos	Seramente fragmentada ou em 10 localidades ou menos
	Redução em qualquer dos seguintes: a) range de distribuição b) área de ocupação c) área, extensão ou qualidade do habitat d) número de localidades ou de subpopulações e) número de indivíduos maduros Flutuações em qualquer dos seguintes: a) range de distribuição b) área ocupada c) número de localidades ou subpopulações		
Estimativa populacional	Estimativa < 250 indivíduos maduros e: Redução 25% em 3 anos ou uma geração, o que for mais longo ou Redução do número de indivíduos maduros e da estrutura populacional a) nenhuma população com > 50 indivíduos maduros ou b) todos os indivíduos em uma única subpopulação	Estimativa < 2,500 indivíduos maduros e: Redução 15% em 5 anos ou duas gerações, o que for mais longo ou Redução do número de indivíduos maduros e da estrutura populacional a) nenhuma população com > 250 indivíduos maduros ou b) todos os indivíduos em uma única subpopulação	Estimativa < 10,000 indivíduos maduros e: Redução 20% em 10 anos ou 3 gerações, o que for mais longo ou Redução do número de indivíduos maduros e da estrutura populacional a) nenhuma população >1,000 indivíduos maduros ou b) todos os indivíduos em uma única subpopulação
Número de indivíduos maduros	Estimativa < 50 indivíduos maduros	Estimativa < 250 indivíduos maduros	Estimativa < 1,000 indivíduos maduros
Probabilidade de extinção	50% em 5 anos ou 2 gerações, o que for mais longo	20% em 20 anos ou 5 gerações, o que for mais longo	10% em 100 anos

seguintes elementos, os quais por sua vez devem ser especificados:

- (a) observação direta
- (b) um índice de abundância apropriado para o táxon
- (c) uma redução da área de ocupação e na extensão de ocorrência e/ou qualidade do habitat
- (d) níveis reais ou potenciais de exploração
- (e) efeitos da introdução de taxa, hibridação, elementos patogênicos, poluentes, competidores ou parasitas.

2. Uma redução em pelo menos 80%, projetada ou suposta que será alcançada nos 10 anos seguintes ou 3 gerações, selecionando o maior deles, baseada dos pontos (b), (c), (d) ou (e) acima, os quais por sua vez devem ser especificados.

B. Extensão de ocorrência estimada em menos de 100 km² ou área de ocupação estimada como menor de 10 km², e estimativas que indiquem qualquer uma das seguintes:

- 1. Severamente fragmentada ou se sabe que só existe em uma única localidade.
- 2. Em declínio contínuo, observado, inferido ou projetado por qualquer dos seguintes elementos:
 - (a) extensão de ocorrência
 - (b) área de ocupação
 - (c) área, extensão e ou qualidade do habitat
 - (d) número de localidades ou subpopulações
 - (e) número de indivíduos maduros.

3. Flutuações extremas em qualquer dos seguintes componentes:

- (a) extensão de ocorrência
- (b) área de ocupação
- (c) número de localidades ou subpopulações
- (d) número de indivíduos maduros.

C. População estimada em números menores de 250 indivíduos maduros e qualquer dos seguintes elementos:

- 1. Um declínio contínuo estimado em pelo menos 25% no período de 3 anos ou de uma geração, selecionando o maior dos dois, ou
- 2. Um declínio contínuo, observado, projetado ou inferido, do número de indivíduos maduros estrutural populacional de qualquer das seguintes formas:
 - (a) severamente fragmentada (por exemplo: quando estima-se que nenhuma subpopulação con-

tém mais 50 indivíduos maduros)
(b) todos os indivíduos estão em única subpopulação.

D. População estimada em menos de 50 indivíduos maduros.

E. Uma análise quantitativa mostra que a probabilidade de extinção na natureza é de pelo menos 50% nos 10 anos seguintes ou em 3 gerações, selecionando-se o maior deles.

Em Perigo (EN)

Um táxon encontra-se Em Perigo quando, não estando Em Perigo Crítico, enfrenta um sério risco de extinção na natureza, em futuro próximo, conforme é definido por qualquer dos seguintes critérios (A até E):

A. Redução da população por qualquer das seguintes por qualquer das seguintes formas:

- 1. Uma redução observada, estimada, inferida ou suposta de pelo menos 50% durante os últimos 10 anos ou 3 gerações, selecionando-se o maior deles, baseada em qualquer dos seguintes elementos, os quais por sua vez devem ser especificados:
 - (a) observação direta
 - (b) um índice de abundância apropriado para o táxon
 - (c) uma declínio da área de ocupação e na extensão de ocorrência e/ou qualidade do habitat
 - (d) níveis reais ou potenciais de exploração
 - (e) efeitos da introdução de taxa, hibridação, elementos patogênicos, poluentes, competidores ou parasitas.

2. Uma redução em pelo menos 50%, projetada ou suposta, que será alcançada nos 10 anos seguintes ou 3 gerações, selecionando o maior deles, baseada dos pontos (b), (c), (d) ou (e) acima, os quais por sua vez devem ser especificados.

B. Extensão de ocorrência estimada em menos de 5,000 km² ou área de ocupação estimada como menor de 500 km², e estimativas que indiquem qualquer uma das seguintes:

- 1. Severamente fragmentada ou se sabe que existem em não mais de cinco localidades.
- 2. Em declínio contínuo, observado, inferido ou projetado por qualquer dos seguintes elementos:
 - (a) extensão de ocorrência
 - (b) área de ocupação
 - (c) área, extensão e ou qualidade do habitat
 - (d) número de localidades ou

subpopulações

(e) número de indivíduos maduros.

3. Flutuações extremas em qualquer dos seguintes componentes:

- (a) extensão de ocorrência
- (b) área de ocupação
- (c) número de localidades ou subpopulações
- (d) número de indivíduos maduros.

C. População estimada em números menores de 2,500 indivíduos maduros e qualquer dos seguintes elementos:

- 1. Um declínio contínuo estimado em pelo menos 25% no período de 5 anos ou de 2 gerações, selecionando-se o maior dos dois, ou
- 2. Um declínio contínuo, observado, projetado ou inferido, do número de indivíduos maduros estrutural populacional de qualquer das seguintes formas:
 - (a) severamente fragmentada (por exemplo: quando estima-se que nenhuma subpopulação contém mais 250 indivíduos maduros)
 - (b) todos os indivíduos estão em única subpopulação.

D. População estimada em menos de 250 indivíduos maduros.

E. Uma análise quantitativa mostra que a probabilidade de extinção na natureza é de pelo menos 20% nos 20 anos seguintes ou em 5 gerações, selecionando-se o maior deles.

Vulnerável (VU)

Um táxon encontra-se vulnerável quando, não estando Em Perigo Crítico ou Em Perigo, enfrenta um sério risco de extinção na natureza, a médio prazo, conforme é definido por qualquer dos seguintes critérios (A até E):

A. Redução da população por qualquer das seguintes formas:

- 1. Uma redução observada, estimada, inferida ou suposta de pelo menos 20% durante os últimos 10 anos ou 3 gerações, o que for maior, baseada em qualquer dos seguintes elementos, os quais por sua vez devem ser especificados:
 - (a) observação direta
 - (b) um índice de abundância apropriado para o táxon
 - (c) uma declínio da área de ocupação e na extensão de ocorrência e/ou qualidade do habitat
 - (d) níveis reais ou potenciais de exploração

(e) efeitos da introdução de taxa, hibridação, elementos patogênicos, poluentes, competidores ou parasitas.

2. Uma redução em pelo menos 20%, projetada ou suposta, que será alcançada nos 10 anos seguintes ou 3 gerações, o que for maior, baseada dos pontos (b), (c), (d) ou (e) acima, os quais por sua vez devem ser especificados.

B. Extensão de ocorrência estimada em menos de 20,000 km² ou área de ocupação estimada como menor de 2,000 km², e estimativas que indiquem qualquer uma das seguintes:

1. Severamente fragmentada ou quando se sabe que existem em não mais de dez localidades.
2. Em declínio contínuo, observado, inferido ou projetado por qualquer dos seguintes elementos:
 - (a) extensão de ocorrência
 - (b) área de ocupação
 - (c) área, extensão e ou qualidade do habitat
 - (d) número de localidades ou subpopulações
 - (e) número de indivíduos maduros.

ros.

3. Flutuações extremas em qualquer dos seguintes componentes:

- (a) extensão de ocorrência
- (b) área de ocupação
- (c) número de localidades ou subpopulações
- (d) número de indivíduos maduros.

C. População estimada em números menores de 10,000 indivíduos maduros e qualquer dos seguintes elementos:

1. Um declínio contínuo estimado em pelo menos 10% no período de 10 anos ou de 3 gerações, o que for maior, ou
2. Um declínio contínuo, observado, projetado ou inferido, do número de indivíduos maduros e estrutura populacional de qualquer das seguintes formas:
 - (a) severamente fragmentada (por exemplo: quando estima-se que nenhuma subpopulação contém mais 1,000 indivíduos maduros)
 - (b) todos os indivíduos estão em única subpopulação.

D. População muito pequena ou restrita a uma das seguintes formas:

1. População estimada em menos de 1,000 indivíduos maduros.
2. População caracterizada por uma séria restrição em sua área de ocupação (tipicamente menor de 100 km²) ou no número de localidades (tipicamente menos de 5). Um táxon nessa condição está sujeito às atividades humanas (ou por eventos estocásticos, cujo impacto é agravado por atividades humanas) em um período de tempo muito pequeno em futuro imprevisível e, assim, chegaria a estar Em Perigo Crítico ou Extinto num período de tempo muito pequeno.

E. Uma análise quantitativa mostra que a probabilidade de extinção na natureza é de pelo menos 10% nos próximos 100 anos.

*Tradução livre de Jesuina Maria da Rocha e Júnia Beatriz Oliveira Souza e revisão técnica de Francisco de Assis Néo.

Este trabalho será publicado pelo IBAMA/ DEVIS

APPENDIX 3

2001 IUCN Red List Categories

VERSION 3.1

Prepared by the

IUCN Species Survival Commission

As approved by the

51st meeting of the IUCN Council

Gland, Switzerland

9 February 2000

I. INTRODUCTION

1. The IUCN Red List Categories are intended to be an easily and widely understood system for classifying species at high risk of global extinction. The general aim of the system is to provide an explicit, objective framework for the classification of the broadest range of species according to their extinction risk. However, while the Red List may focus attention on those taxa at the highest risk, it is not the sole means of setting priorities for conservation measures for their protection.

Extensive consultation and testing in the development of the system strongly suggest that it is robust across most organisms.

However, it should be noted that although the system places species into the threatened categories with a high degree of consistency, the criteria do not take into account the life histories of every species. Hence, in certain individual cases, the risk of extinction may be under- or over-estimated.

2. Before 1994 the more subjective threatened species categories used in IUCN Red Data Books and Red Lists had been in place, with some modification, for almost 30 years. Although the need to revise the categories had long been recognized (Fitter and Fitter 1987), the current phase of development only began in 1989 following a request from the IUCN Species Survival

Commission (SSC) Steering Committee to develop a more objective approach. The IUCN Council adopted the new Red List system in 1994.

The IUCN Red List Categories and Criteria have several specific aims:

- To provide a system that can be applied consistently by different people;
- To improve objectivity by providing users with clear guidance on how to evaluate different factors which affect the risk of extinction;
- To provide a system which will facilitate comparisons across widely different taxa;
- To give people using threatened species lists a better understanding of how individual species were classified.

3. Since their adoption by IUCN Council in 1994, the IUCN Red List Categories have become widely recognized internationally, and they are now used in a range of publications and listings produced by IUCN, as well as by numerous governmental and non-governmental organizations. Such broad and extensive use revealed the need for a number of improvements, and SSC was mandated by the 1996 World Conservation Congress (WCC Res. 1.4) to conduct a review of the system (IUCN 1996). This document presents the revisions accepted by the IUCN Council.

The proposals presented in this document result from a continuing process of drafting, consultation and validation. The production of a large number of draft proposals has led to some confusion, especially as each draft has been used for classifying some set of species for conservation purposes. To clarify matters, and to open the way for modifications as and when they become necessary, a system for version numbering has been adopted as follows:

- Version 1.0: Mace and Lande (1991)
The first paper discussing a new basis for the categories, and presenting numerical 2 criteria especially relevant for large vertebrates.
- Version 2.0: Mace *et al.* (1992)
A major revision of Version 1.0, including numerical criteria appropriate to all organisms and introducing the non-threatened categories.
- Version 2.1: IUCN (1993)
Following an extensive consultation process within SSC, a number of changes were made to the details of the criteria, and fuller explanation of basic principles was included. A more explicit structure clarified the significance of the non-threatened categories.
- Version 2.2: Mace and Stuart (1994)
Following further comments received and additional validation exercises, some minor changes to the criteria were made. In addition, the Susceptible category present in Versions 2.0 and 2.1 was subsumed into the Vulnerable category. A precautionary application of the system was emphasised.
- Version 2.3: IUCN (1994)
IUCN Council adopted this version, which incorporated changes as a result of comments from IUCN members, in December 1994. The initial version of this document was published without the necessary bibliographic details, such as date of publication and ISBN number, but these were included in the subsequent reprints in 1998 and 1999. This

version was used for the 1996 *IUCN Red List of Threatened Animals* (Baillie and Groombridge 1996), *The World List of Threatened Trees* (Oldfield *et al.* 1998) and the 2000 *IUCN Red List of Threatened Species* (Hilton-Taylor 2000).

- Version 3.0: IUCN/SSC Criteria Review Working Group (1999)

Following comments received, a series of workshops were convened to look at the IUCN Red List Criteria following which, changes were proposed affecting the criteria, the definitions of some key terms and the handling of uncertainty.

- Version 3.1: IUCN (2001)

The IUCN Council adopted this latest version, which incorporated changes as a result of comments from the IUCN and SSC memberships and from a final meeting of the Criteria Review Working Group, in February 2000. All new assessments from January 2001 should use the latest adopted version and cite the year of publication and version number.

4. In the rest of this document, the proposed system is outlined in several sections. Section II, the Preamble, presents basic information about the context and structure of the system, and the procedures that are to be followed in applying the criteria to species. Section III provides definitions of key terms used. Section IV presents the categories, while Section V details the quantitative criteria used for classification within the threatened categories. Annex I provides guidance on how to deal with uncertainty when applying the criteria; Annex II suggests a standard format for citing the Red List Categories and Criteria; and Annex III outlines the documentation requirements for taxa to be included on IUCN's global Red Lists. It is important for the effective functioning of the system that all sections are read and understood to ensure that the definitions and rules are followed. (Note: Annexes I, II and III will be updated on a regular basis.)

II. PREAMBLE

The information in this section is intended to direct and facilitate the use and interpretation of the categories (Critically Endangered, Endangered, etc.), criteria (A to E), and subcriteria (1, 2, etc.; a, b, etc.; i, ii, etc.).

1. Taxonomic Level and Scope of the Categorisation Process

The criteria can be applied to any taxo-

nomic unit at or below the species level. In the following information, definitions and criteria the term 'taxon' is used for convenience, and may represent species or lower taxonomic levels, including forms that are not yet formally described. There is sufficient range among the different criteria to enable the appropriate listing of taxa from the complete taxonomic spectrum, with the exception of micro-organisms. The criteria may also be applied within any specified geographical or political area, although in such cases special notice should be taken of point 14. In presenting the results of applying the criteria, the taxonomic unit and area under consideration should be specified in accordance with the documentation guidelines (see Annex 3). The categorisation process should only be applied to wild populations inside their natural range, and to populations resulting from benign introductions. The latter are defined in the IUCN *Guidelines for Re-introductions* (IUCN 1998) as '...an attempt to establish a species, for the purpose of conservation, outside its recorded distribution, but within an appropriate habitat and eco-geographical area. This is a feasible conservation tool only when there is no remaining area left within a species' historic range'.

2. Nature of the Categories

Extinction is a chance process. Thus, a listing in a higher extinction risk category implies a higher expectation of extinction, and over the time-frames specified more taxa listed in a higher category are expected to go extinct than those in a lower one (without effective conservation action). However, the persistence of some taxa in high-risk categories does not necessarily mean their initial assessment was inaccurate.

All taxa listed as Critically Endangered qualify for Vulnerable and Endangered, and all listed as Endangered qualify for Vulnerable. Together these categories are described as 'threatened'. The threatened categories form a part of the overall scheme. It will be possible to place all taxa into one of the categories (see Figure 1).

3. Role of the Different Criteria

For listing as Critically Endangered, Endangered or Vulnerable there is a range of quantitative criteria; meeting any one of these criteria qualifies a taxon for listing at that level of threat. Each taxon should be evaluated against all the criteria. Even though some criteria will be inappropriate

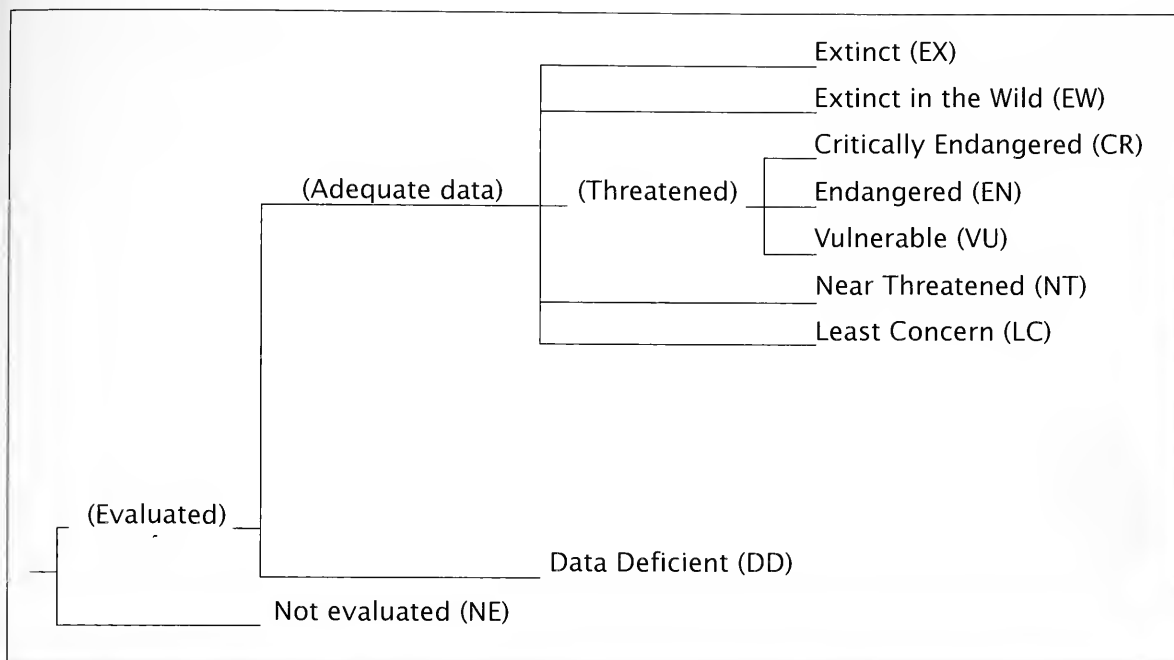


Figure 1: Structure of Categories.

for certain taxa (some taxa will never qualify under these however close to extinction they come), there should be criteria appropriate for assessing threat levels for any taxon. The relevant factor is whether *any one* criterion is met, not whether all are appropriate or all are met. Because it will never be clear in advance which criteria are appropriate for a particular taxon, each taxon should be evaluated against all the criteria, and *all* criteria met at the highest threat category must be listed.

4. Derivation of Quantitative Criteria

The different criteria (A-E) are derived from a wide review aimed at detecting risk factors across the broad range of organisms and the diverse life histories they exhibit. The quantitative values presented in the various criteria associated with threatened categories were developed through wide consultation, and they are set at what are generally judged to be appropriate levels, even if no formal justification for these values exists. The levels for different criteria within categories were set independently but against a common standard. Broad consistency between them was sought.

5. Conservation Actions in the Listing Process

The criteria for the threatened categories are to be applied to a taxon whatever the

level of conservation action affecting it. It is important to emphasise here that a taxon may require conservation action even if it is not listed as threatened. Conservation actions which may benefit the taxon are included as part of the documentation requirements (see Annex 3).

6. Data Quality and the Importance of Inference and Projection

The criteria are clearly quantitative in nature. However, the absence of high-quality data should not deter attempts at applying the criteria, as methods involving estimation, inference and projection are emphasised as being acceptable throughout. Inference and projection may be based on extrapolation of current or potential threats into the future (including their rate of change), or of factors related to population abundance or distribution (including dependence on other taxa), so long as these can reasonably be supported. Suspected or inferred patterns in the recent past, present or near future can be based on any of a series of related factors, and these factors should be specified as part of the documentation.

Taxa at risk from threats posed by future events of low probability but with severe consequences (catastrophes) should be identified by the criteria (e.g. small distributions, few locations). Some threats need

to be identified particularly early, and appropriate actions taken, because their effects are irreversible or nearly so (e.g., pathogens, invasive organisms, hybridization).

7. Problems of Scale

Classification based on the sizes of geographic ranges or the patterns of habitat occupancy is complicated by problems of spatial scale. The finer the scale at which the distributions or habitats of taxa are mapped, the smaller the area will be that they are found to occupy, and the less likely it will be that range estimates (at least for 'area of occupancy': see Definitions, point 10) exceed the thresholds specified in the criteria. Mapping at finer scales reveals more areas in which the taxon is unrecorded. Conversely, coarse-scale mapping reveals fewer unoccupied areas, resulting in range estimates that are more likely to exceed the thresholds for the threatened categories. The choice of scale at which range is estimated may thus, itself, influence the outcome of Red List assessments and could be a source of inconsistency and bias.

It is impossible to provide any strict but general rules for mapping taxa or habitats; the most appropriate scale will depend on the taxon in question, and the origin and comprehensiveness of the distribution data.

8. Uncertainty

The data used to evaluate taxa against the criteria are often estimated with considerable uncertainty. Such uncertainty can arise from any one or all of the following three factors: natural variation, vagueness in the terms and definitions used, and measurement error. The way in which this uncertainty is handled can have a strong influence on the results of an evaluation.

Details of methods recommended for handling uncertainty are included in Annex 1, and assessors are encouraged to read and follow these principles. In general, when uncertainty leads to wide variation in the results of assessments, the range of possible outcomes should be specified. A single category must be chosen and the basis for the decision should be documented; it should be both precautionary and credible.

When data are very uncertain, the category of 'Data Deficient' may be assigned. However, in this case the assessor must provide documentation showing that this category has been assigned because data are inadequate to determine a threat category. It is important to recognize that taxa that are poorly known can often be assigned a threat category on the basis of background information concerning the deterioration of their habitat and/or other causal factors; therefore the liberal use of 'Data Deficient' is discouraged.

9. Implications of Listing

Listing in the categories of Not Evaluated and Data Deficient indicates that no assessment of extinction risk has been made, though for different reasons. Until such time as an assessment is made, taxa listed in these categories should not be treated as if they were non-threatened. It may be appropriate (especially for Data Deficient forms) to give them the same degree of attention as threatened taxa, at least until their status can be assessed.

10. Documentation

All assessments should be documented. Threatened classifications should state the criteria and subcriteria that were met. No assessment can be accepted for the IUCN Red List as valid unless at least one criterion is given. If more than one criterion or subcriterion is met, then each should be listed. If a re-evaluation indicates that the documented criterion is no longer met, this should not result in automatic reassign-

ment to a lower category of threat (downlisting). Instead, the taxon should be re-evaluated against all the criteria to clarify its status. The factors responsible for qualifying the taxon against the criteria, especially where inference and projection are used, should be documented (see Annexes 2 and 3). The documentation requirements for other categories are also specified in Annex 3.

11. Threats and Priorities

The category of threat is not necessarily sufficient to determine priorities for conservation action. The category of threat simply provides an assessment of the extinction risk under current circumstances, whereas a system for assessing priorities for action will include numerous other factors concerning conservation action such as costs, logistics, chances of success, and other biological characteristics of the subject.

12. Re-Evaluation

Re-evaluation of taxa against the criteria should be carried out at appropriate intervals. This is especially important for taxa listed under Near Threatened, Data Deficient and for threatened taxa whose status is known or suspected to be deteriorating.

13. Transfer Between Categories

The following rules govern the movement of taxa between categories:

A. A taxon may be moved from a category of higher threat to a category of lower threat if none of the criteria of the higher category has been met for five years or more.

B. If the original classification is found to have been erroneous, the taxon may be transferred to the appropriate category or removed from the threatened categories altogether, without delay (but see Point 10 above).

C. Transfer from categories of lower to higher risk should be made without delay.

14. Use at Regional Level

The IUCN Red List Categories and Criteria were designed for global taxon assessments.

However, many people are interested in applying them to subsets of global data, especially at regional, national or local levels. To do this it is important to refer to

guidelines prepared by the IUCN/SSC Regional Applications Working Group (e.g., Gärdenfors *et al.* 1999). When applied at national or regional levels it must be recognized that a global category may not be the same as a national or regional category for a particular taxon. For example, taxa classified as Least Concern globally might be Critically Endangered within a particular region where numbers are very small or declining, perhaps only because they are at the margins of their global range. Conversely, taxa classified as Vulnerable on the basis of their global declines in numbers or range might be Least Concern within a particular region where their populations are stable. It is also important to note that taxa endemic to regions or nations will be assessed globally in any regional or national applications of the criteria, and in these cases great care must be taken to check that an assessment has not already been undertaken by a Red List Authority (RLA), and that the categorisation is agreed with the relevant RLA (e.g., an SSC Specialist Group known to cover the taxon).

III. DEFINITIONS

1. Population and Population Size (Criteria A, C and D)

The term 'population' is used in a specific sense in the Red List Criteria that is different to its common biological usage. Population is here defined as the total number of individuals of the taxon. For functional reasons, primarily owing to differences between life forms, population size is measured as numbers of mature individuals only. In the case of taxa obligately dependent on other taxa for all or part of their life cycles, biologically appropriate values for the host taxon should be used.

2. Subpopulations (Criteria B and C)

Subpopulations are defined as geographically or otherwise distinct groups in the population between which there is little demographic or genetic exchange (typically one successful migrant individual or gamete per year or less).

3. Mature Individuals (Criteria A, B, C and D)

The number of mature individuals is the number of individuals known, estimated or inferred to be capable of reproduction. When estimating this quantity, the following points should be borne in mind:

- Mature individuals that will never pro-

duce new recruits should not be counted (e.g. densities are too low for fertilization).

- In the case of populations with biased adult or breeding sex ratios, it is appropriate to use lower estimates for the number of mature individuals, which take this into account.
- Where the population size fluctuates, use a lower estimate. In most cases this will be much less than the mean.
- Reproducing units within a clone should be counted as individuals, except where such units are unable to survive alone (e.g. corals).
- In the case of taxa that naturally lose all or a subset of mature individuals at some point in their life cycle, the estimate should be made at the appropriate time, when mature individuals are available for breeding.
- Re-introduced individuals must have produced viable offspring before they are counted as mature individuals.

4. Generation (Criteria A, C and E)

Generation length is the average age of parents of the current cohort (i.e. newborn individuals in the population). Generation length therefore reflects the turnover rate of breeding individuals in a population. Generation length is greater than the age at first breeding and less than the age of the oldest breeding individual, except in taxa that breed only once. Where generation length varies under threat, the more natural, i.e. pre-disturbance, generation length should be used.

5. Reduction (Criterion A)

A reduction is a decline in the number of mature individuals of at least the amount (%) stated under the criterion over the time period (years) specified, although the decline need not be continuing. A reduction should not be interpreted as part of a fluctuation unless there is good evidence for this. The downward phase of a fluctuation will not normally count as a reduction.

6. Continuing Decline (Criteria B and C)

A continuing decline is a recent, current or projected future decline (which may be smooth, irregular or sporadic) which is liable to continue unless remedial measures are taken.

Fluctuations will not normally count as continuing declines, but an observed de-

cline should not be considered as a fluctuation unless there is evidence for this.

7. Extreme Fluctuations (Criteria B and C)

Extreme fluctuations can be said to occur in a number of taxa when population size or distribution area varies widely, rapidly and frequently, typically with a variation greater than one order of magnitude (i.e. a tenfold increase or decrease).

8. Severely Fragmented (Criterion B)

The phrase 'severely fragmented' refers to the situation in which increased extinction risk to the taxon results from the fact that most of its individuals are found in small and relatively isolated subpopulations (in certain circumstances this may be inferred from habitat information). These small subpopulations may go extinct, with a reduced probability of recolonization.

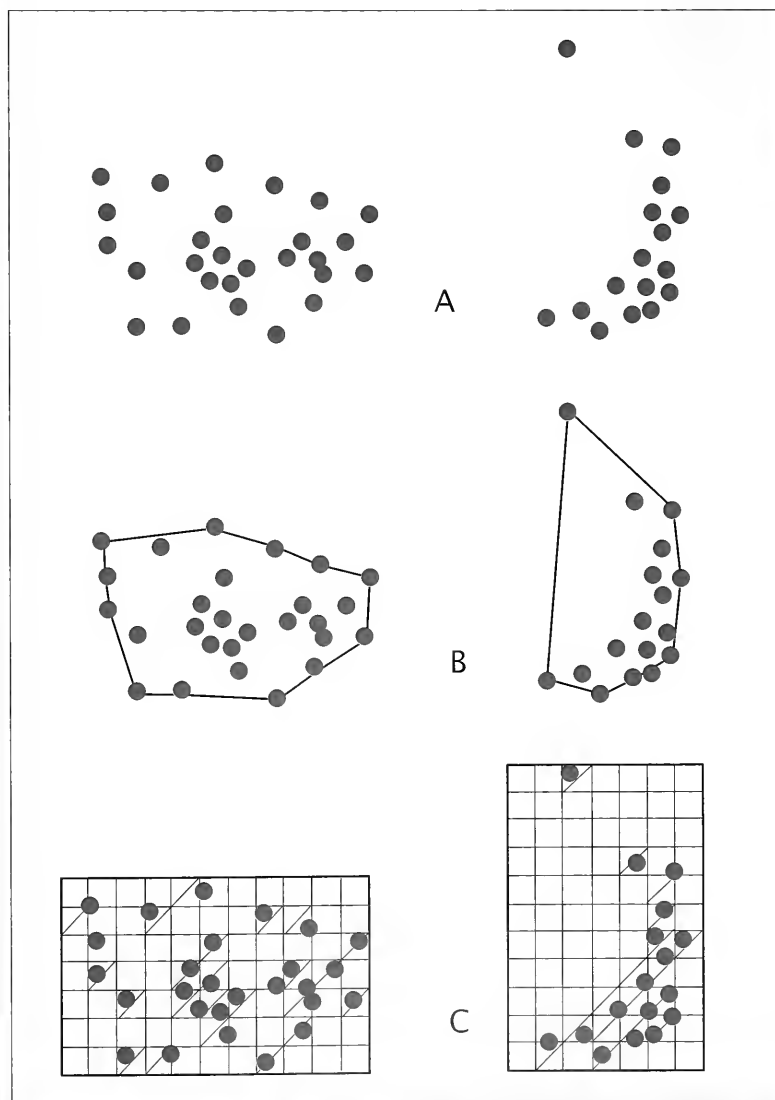


Figure 2. Two examples of the distinction between extent of occurrence and area of occupancy. (A) is the spatial distribution of known, inferred or projected sites of present occurrence. (B) shows one possible boundary to the extent of occurrence, which is the measured area within this boundary. (C) shows one measure of area of occupancy which can be achieved by the sum of the occupied grid squares.

9. Extent of Occurrence (Criteria A and B)

Extent of occurrence is defined as the area contained within the shortest continuous imaginary boundary which can be drawn to encompass all the known, inferred or projected sites of present occurrence of a taxon, excluding cases of vagrancy (see Figure 2). This measure may exclude discontinuities or disjunctions within the overall distributions of taxa (e.g. large areas of obviously unsuitable habitat) (but see 'area of occupancy', point 10 below). Extent of occurrence can often be measured by a minimum convex polygon (the smallest polygon in which no internal angle exceeds 180 degrees and which contains all the sites of occurrence).

10. Area of Occupancy (Criteria A, B and D)

Area of occupancy is defined as the area within its 'extent of occurrence' (see point 9 above) which is occupied by a taxon, excluding cases of vagrancy. The measure reflects the fact that a taxon will not usually occur throughout the area of its extent of occurrence, which may contain unsuitable or unoccupied habitats. In some cases (e.g. irreplaceable colonial nesting sites, crucial feeding sites for migratory taxa) the area of occupancy is the smallest area essential at any stage to the survival of existing populations of a taxon. The size of the area of occupancy will be a function of the scale at which it is measured, and should be at a scale appropriate to relevant biological aspects of the taxon, the nature of threats and the available data (see point 7 in the Preamble). To avoid inconsistencies and bias in assessments caused by estimating area of occupancy at different scales, it may be necessary to standardize estimates by applying a scale correction factor. It is difficult to give strict guidance on how standardization should be done because different types of taxa have different scale-area relationships.

11. Location (Criteria B and D)

The term 'location' defines a geographically or ecologically distinct area in which a single threatening event can rapidly affect all individuals of the taxon present. The size of the location depends on the area covered by the threatening event and may in-

clude part of one or many subpopulations. Where a taxon is affected by more than one threatening event, location should be defined by considering the most serious plausible threat.

12. Quantitative Analysis (Criterion E)

A quantitative analysis is defined here as any form of analysis which estimates the extinction probability of a taxon based on known life history, habitat requirements, threats and any specified management options. Population viability analysis (PVA) is one such technique. Quantitative analyses should make full use of all relevant available data. In a situation in which there is limited information, such data as are available can be used to provide an estimate of extinction risk (for instance, estimating the impact of stochastic events on habitat). In presenting the results of quantitative analyses, the assumptions (which must be appropriate and defensible), the data used and the uncertainty in the data or quantitative model must be documented.

IV. THE CATEGORIES¹

A representation of the relationships between the categories is shown in Figure 1.

EXTINCT (EX)

A taxon is Extinct when there is no reasonable doubt that the last individual has died. A taxon is presumed Extinct when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

EXTINCT IN THE WILD (EW)

A taxon is Extinct in the Wild when it is known only to survive in cultivation, in captivity or as a naturalized population (or populations) well outside the past range. A taxon is presumed Extinct in the Wild when exhaustive surveys in known and/or expected habitat, at appropriate times (diurnal, seasonal, annual), throughout its historic range have failed to record an individual. Surveys should be over a time frame appropriate to the taxon's life cycle and life form.

CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the criteria A to E for Critically Endangered (see Section V), and it is therefore considered to be facing an extremely high risk of extinction in the wild.

ENDANGERED (EN)

A taxon is Endangered when the best available evidence indicates that it meets any of the criteria A to E for Endangered (see Section V), and it is therefore considered to be facing a very high risk of extinction in the wild.

VULNERABLE (VU)

A taxon is Vulnerable when the best available evidence indicates that it meets any of the criteria A to E for Vulnerable (see Section V), and it is therefore considered to be facing a high risk of extinction in the wild.

NEAR THREATENED (NT)

A taxon is Near Threatened when it has been evaluated against the criteria but does not qualify for Critically Endangered, Endangered or Vulnerable now, but is close to qualifying for or is likely to qualify for a threatened category in the near future.

LEAST CONCERN (LC)

A taxon is Least Concern when it has been evaluated against the criteria and does not qualify for Critically Endangered, Endangered, Vulnerable or Near Threatened. Widespread and abundant taxa are included in this category.

DATA DEFICIENT (DD)

A taxon is Data Deficient when there is inadequate information to make a direct, or indirect, assessment of its risk of extinction based on its distribution and/or population status. A taxon in this category may be well studied, and its biology well known, but appropriate data on abundance and/or distribution are lacking. Data Deficient is therefore not a category of threat.

Listing of taxa in this category indicates that more information is required and acknowledges the possibility that future research

¹ Note: As in previous IUCN categories, the abbreviation of each category (in parenthesis) follows the English denominations when translated into other languages (see Annex 2).

will show that threatened classification is appropriate. It is important to make positive use of whatever data are available. In many cases great care should be exercised in choosing between DD and a threatened status. If the range of a taxon is suspected to be relatively circumscribed, and a considerable period of time has elapsed since the last record of the taxon, threatened status may well be justified.

NOT EVALUATED (NE)

A taxon is Not Evaluated when it has not yet been evaluated against the criteria.

V. THE CRITERIA FOR CRITICALLY ENDANGERED, ENDANGERED AND VULNERABLE

CRITICALLY ENDANGERED (CR)

A taxon is Critically Endangered when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing an extremely high risk of extinction in the wild:

A. Reduction in population size based on any of the following:

1. An observed, estimated, inferred or suspected population size reduction of $\geq 90\%$ over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:
 - (a) direct observation
 - (b) an index of abundance appropriate to the taxon
 - (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
 - (d) actual or potential levels of exploitation
 - (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

2. An observed, estimated, inferred or suspected population size reduction of $\geq 80\%$ over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

3. A population size reduction of $\geq 80\%$, projected or suspected to be met within the next 10 years or three generations, whichever is the longer

(up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.

4. An observed, estimated, inferred, projected or suspected population size reduction of $\geq 80\%$ over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, and where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:

1. Extent of occurrence estimated to be less than 100 km², and estimates indicating at least two of a-c:

- a. Severely fragmented or known to exist at only a single location.
- b. Continuing decline, observed, inferred or projected, in any of the following:

- (i) extent of occurrence
- (ii) area of occupancy
- (iii) area, extent and/or quality of habitat
- (iv) number of locations or subpopulations
- (v) number of mature individuals.

c. Extreme fluctuations in any of the following:

- (i) extent of occurrence
- (ii) area of occupancy
- (iii) number of locations or subpopulations
- (iv) number of mature individuals.

2. Area of occupancy estimated to be less than 10 km², and estimates indicating at least two of a-c:

- a. Severely fragmented or known to exist at only a single location.
- b. Continuing decline, observed, inferred or projected, in any of the following:

- (i) extent of occurrence
- (ii) area of occupancy
- (iii) area, extent and/or quality of habitat
- (iv) number of locations or subpopulations
- (v) number of mature individuals.

c. Extreme fluctuations in any of the following:

- (i) extent of occurrence
- (ii) area of occupancy

(iii) number of locations or subpopulations

(iv) number of mature individuals.

C. Population size estimated to number fewer than 250 mature individuals and either:

1. An estimated continuing decline of at least 25% within three years or one generation, whichever is longer, (up to a maximum of 100 years in the future) OR

2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):

(a) Population structure in the form of one of the following:

(i) no subpopulation estimated to contain more than 50 mature individuals, OR

(ii) at least 90% of mature individuals in one subpopulation.

(b) Extreme fluctuations in number of mature individuals.

D. Population size estimated to number fewer than 50 mature individuals.

E. Quantitative analysis showing the probability of extinction in the wild is at least 50% within 10 years or three generations, whichever is the longer (up to a maximum of 100 years).

ENDANGERED (EN)

A taxon is Endangered when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a very high risk of extinction in the wild:

A. Reduction in population size based on any of the following:

1. An observed, estimated, inferred or suspected population size reduction of $\geq 70\%$ over the last 10 years or three generations, whichever is the longer, where the causes of the reduction are clearly reversible AND understood AND ceased, based on (and specifying) any of the following:

- (a) direct observation
- (b) an index of abundance appropriate to the taxon
- (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
- (d) actual or potential levels of exploitation
- (e) the effects of introduced taxa, hybridization, pathogens, pollut-

ants, competitors or parasites.

2. An observed, estimated, inferred or suspected population size reduction of $\geq 50\%$ over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

3. A population size reduction of $\geq 50\%$, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.

4. An observed, estimated, inferred, projected or suspected population size reduction of $\geq 50\%$ over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, AND where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:

1. Extent of occurrence estimated to be less than 5,000 km², and estimates indicating at least two of a-c:

a. Severely fragmented or known to exist at no more than five locations.

b. Continuing decline, observed, inferred or projected, in any of the following:

- (i) extent of occurrence
- (ii) area of occupancy
- (iii) area, extent and/or quality of habitat
- (iv) number of locations or subpopulations
- (v) number of mature individuals.

c. Extreme fluctuations in any of the following:

- (i) extent of occurrence
- (ii) area of occupancy
- (iii) number of locations or subpopulations
- (iv) number of mature individuals.

2. Area of occupancy estimated to be less than 500 km², and estimates indicating at least two of a-c:

a. Severely fragmented or known to exist at no more than five loca-

tions.

b. Continuing decline, observed, inferred or projected, in any of the following:

- (i) extent of occurrence
- (ii) area of occupancy
- (iii) area, extent and/or quality of habitat
- (iv) number of locations or subpopulations
- (v) number of mature individuals.

c. Extreme fluctuations in any of the following:

- (i) extent of occurrence
- (ii) area of occupancy
- (iii) number of locations or subpopulations
- (iv) number of mature individuals.

C. Population size estimated to number fewer than 2,500 mature individuals and either:

1. An estimated continuing decline of at least 20% within five years or two generations, whichever is longer, (up to a maximum of 100 years in the future) OR

2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):

(a) Population structure in the form of one of the following:

- (i) no subpopulation estimated to contain more than 250 mature individuals, OR
- (ii) at least 95% of mature individuals in one subpopulation.

(b) Extreme fluctuations in number of mature individuals.

D. Population size estimated to number fewer than 250 mature individuals.

E. Quantitative analysis showing the probability of extinction in the wild is at least 20% within 20 years or five generations, whichever is the longer (up to a maximum of 100 years).

VULNERABLE (VU)

A taxon is Vulnerable when the best available evidence indicates that it meets any of the following criteria (A to E), and it is therefore considered to be facing a high risk of extinction in the wild:

A. Reduction in population size based on any of the following:

1. An observed, estimated, inferred or suspected population size reduction of $\geq 50\%$ over the last 10 years or three generations, whichever is the longer, where the causes of the

reduction are: clearly reversible AND understood AND ceased, based on (and specifying) any of the following:

- (a) direct observation
- (b) an index of abundance appropriate to the taxon
- (c) a decline in area of occupancy, extent of occurrence and/or quality of habitat
- (d) actual or potential levels of exploitation
- (e) the effects of introduced taxa, hybridization, pathogens, pollutants, competitors or parasites.

2. An observed, estimated, inferred or suspected population size reduction of $\geq 30\%$ over the last 10 years or three generations, whichever is the longer, where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

3. A population size reduction of $\geq 30\%$, projected or suspected to be met within the next 10 years or three generations, whichever is the longer (up to a maximum of 100 years), based on (and specifying) any of (b) to (e) under A1.

4. An observed, estimated, inferred, projected or suspected population size reduction of $\geq 30\%$ over any 10 year or three generation period, whichever is longer (up to a maximum of 100 years in the future), where the time period must include both the past and the future, AND where the reduction or its causes may not have ceased OR may not be understood OR may not be reversible, based on (and specifying) any of (a) to (e) under A1.

B. Geographic range in the form of either B1 (extent of occurrence) OR B2 (area of occupancy) OR both:

1. Extent of occurrence estimated to be less than 20,000 km², and estimates indicating at least two of a-c:

a. Severely fragmented or known to exist at no more than 10 locations.

b. Continuing decline, observed, inferred or projected, in any of the following:

- (i) extent of occurrence
- (ii) area of occupancy
- (iii) area, extent and/or quality of habitat
- (iv) number of locations or subpopulations
- (v) number of mature individuals.

- c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
- 2. Area of occupancy estimated to be less than 2,000 km², and estimates indicating at least two of a-c:
 - a. Severely fragmented or known to exist at no more than 10 locations.
 - b. Continuing decline, observed, inferred or projected, in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) area, extent and/or quality of habitat
 - (iv) number of locations or subpopulations
 - (v) number of mature individuals.
 - c. Extreme fluctuations in any of the following:
 - (i) extent of occurrence
 - (ii) area of occupancy
 - (iii) number of locations or subpopulations
 - (iv) number of mature individuals.
- C. Population size estimated to number fewer than 10,000 mature individuals and either:
 - 1. An estimated continuing decline of at least 10% within 10 years or three generations, whichever is longer, (up to a maximum of 100 years in the future) OR
 - 2. A continuing decline, observed, projected, or inferred, in numbers of mature individuals AND at least one of the following (a-b):
 - (a) Population structure in the form of one of the following:
 - (i) no subpopulation estimated to contain more than 1,000 mature individuals, OR
 - (ii) all mature individuals are in one subpopulation.
 - (b) Extreme fluctuations in number of mature individuals.
- D. Population very small or restricted in the form of either of the following:
 - 1. Population size estimated to number fewer than 1,000 mature individuals.
 - 2. Population with a very restricted area of occupancy (typically less than 20 km²) or number of locations (typically five or fewer) such that it

is prone to the effects of human activities or stochastic events within a very short time period in an uncertain future, and is thus capable of becoming Critically Endangered or even Extinct in a very short time period.

E. Quantitative analysis showing the probability of extinction in the wild is at least 10% within 100 years.

Annex 1: Uncertainty

The Red List Criteria should be applied to a taxon based on the available evidence concerning its numbers, trend and distribution. In cases where there are evident threats to a taxon through, for example, deterioration of its only known habitat, a threatened listing may be justified, even though there may be little direct information on the biological status of the taxon itself. In all these instances there are uncertainties associated with the available information and how it was obtained. These uncertainties may be categorised as natural variability, semantic uncertainty and measurement error (Akçakaya *et al.* 2000). This section provides guidance on how to recognize and deal with these uncertainties when using the criteria.

Natural variability results from the fact that species' life histories and the environments in which they live change over time and space. The effect of this variation on the criteria is limited, because each parameter refers to a specific time or spatial scale. Semantic uncertainty arises from vagueness in the definition of terms or lack of consistency in different assessors' usage of them. Despite attempts to make the definitions of the terms used in the criteria exact, in some cases this is not possible without the loss of generality. Measurement error is often the largest source of uncertainty; it arises from the lack of precise information about the parameters used in the criteria. This may be due to inaccuracies in estimating the values or a lack of knowledge. Measurement error may be reduced or eliminated by acquiring additional data. For further details, see Akçakaya *et al.* (2000) and Burgman *et al.* (1999).

One of the simplest ways to represent uncertainty is to specify a best estimate and a range of plausible values. The best estimate itself might be a range, but in any case the best estimate should always be included in the range of plausible values. When data are very uncertain, the range for the best estimate might be the range of plausible

values. There are various methods that can be used to establish the plausible range. It may be based on confidence intervals, the opinion of a single expert, or the consensus opinion of a group of experts. Whichever method is used should be stated and justified in the documentation.

When interpreting and using uncertain data, attitudes toward risk and uncertainty may play an important role. Attitudes have two components. First, assessors need to consider whether they will include the full range of plausible values in assessments, or whether they will exclude extreme values from consideration (known as dispute tolerance). An assessor with a low dispute tolerance would include all values, thereby increasing the uncertainty, whereas an assessor with a high dispute tolerance would exclude extremes, reducing the uncertainty. Second, assessors need to consider whether they have a precautionary or evidentiary attitude to risk (known as risk tolerance). A precautionary attitude will classify a taxon as threatened unless it is certain that it is not threatened, whereas an evidentiary attitude will classify a taxon as threatened only when there is strong evidence to support a threatened classification.

Assessors should resist an evidentiary attitude and adopt a precautionary but realistic attitude to uncertainty when applying the criteria, for example, by using plausible lower bounds, rather than best estimates, in determining population size, especially if it is fluctuating. All attitudes should be explicitly documented.

An assessment using a point estimate (i.e. single numerical value) will lead to a single Red List Category. However, when a plausible range for each parameter is used to evaluate the criteria, a range of categories may be obtained, reflecting the uncertainties in the data. A single category, based on a specific attitude to uncertainty, should always be listed along with the criteria met, while the range of plausible categories should be indicated in the documentation (see Annex 3).

Where data are so uncertain that any category is plausible, the category of 'Data Deficient' should be assigned. However, it is important to recognize that this category indicates that the data are inadequate to determine the degree of threat faced by a taxon, not necessarily that the taxon is poorly known or indeed not threatened. Although Data Deficient is not a threatened category, it indicates a need to obtain more

information on a taxon to determine the appropriate listing; moreover, it requires documentation with whatever available information there is.

Annex 2: Citation of the IUCN Red List Categories and Criteria

In order to promote the use of a standard format for citing the Red List Categories and Criteria the following forms of citation are recommended:

1). The Red List Category may be written out in full or abbreviated as follows (when translated into other languages, the abbreviations should follow the English denominations):

Extinct, EX
Extinct in the Wild, EW
Critically Endangered, CR
Endangered, EN
Vulnerable, VU
Near Threatened, NT
Least Concern, LC
Data Deficient, DD
Not Evaluated, NE

2). Under Section V (the criteria for Critically Endangered, Endangered and Vulnerable) there is a hierarchical alphanumeric numbering system of criteria and subcriteria. These criteria and subcriteria (all three levels) form an integral part of the Red List assessment and all those that result in the assignment of a threatened category must be specified after the Category. Under the criteria A to C and D under Vulnerable, the first level of the hierarchy is indicated by the use of numbers (1-4) and if more than one is met, they are separated by means of the '+' symbol. The second level is indicated by the use of the lower-case alphabet characters (a-e). These are listed without any punctuation. A third level of the hierarchy under Criteria B and C involves the use of lower case roman numerals (i-v). These are placed in parentheses (with no space between the preceding alphabet character and start of the parenthesis) and separated by the use of commas if more than one is listed. Where more than one criterion is met, they should be separated by semicolons. The following are examples of such usage:

EX
CR A1cd
VU A2c+3c
EN B1ac(i,ii,iii)
EN A2c; D
VU D1+2
CR A2c+3c; B1ab(iii)
CR D

VU D2
EN B2ab(i,ii,iii)
VU C2a(ii)
EN A1c; B1ab(iii); C2a(i)
EN B2b(iii)c(ii)
EN B1ab(i,ii,v)c(iii,iv)+2b(i)c(ii,v)
VU B1ab(iii)+2ab(iii)
EN A2abc+3bc+4abc;
B1b(iii,iv,v)c(ii,iii,iv)+2b(iii,iv,v)
c(ii,iii,iv)

Annex 3: Documentation Requirements for Taxa Included on the IUCN Red List

The following is the minimum set of information, which should accompany every assessment submitted for incorporation into the *IUCN Red List of Threatened Species*TM:

- Scientific name including authority details
- English common name/s and any other widely used common names (specify the language of each name supplied)
- Red List Category and Criteria
- Countries of occurrence (including country subdivisions for large nations, e.g. states within the USA, and overseas territories, e.g. islands far from the mainland country)
- For marine species, the Fisheries Areas in which they occur should be recorded (see <http://www.iucn.org/themes/ssc/sis/faomap.htm> for the Fisheries Areas as delimited by FAO, the Food and Agriculture Organization of the United Nations)
- For inland water species, the names of the river systems, lakes, etc. to which they are confined
- A map showing the geographic distribution (extent of occurrence)
- A rationale for the listing (including any numerical data, inferences or uncertainty that relate to the criteria and their thresholds)
- Current population trends (increasing, decreasing, stable or unknown)
- Habitat preferences (using a modified version of the Global Land Cover Characterization (GLCC) classification which is available electronically from <http://www.iucn.org/themes/ssc/sis/authority.htm> or on request from redlist@ssc-uk.org)
- Major threats (indicating past, current and future threats using a standard classification which is available from the SSC web site or e-mail address as shown above)
- Conservation measures, (indicating both current and proposed measures

using a standard classification which is available from the SSC web site or e-mail address as shown above)

- Information on any changes in the Red List status of the taxon, and why the status has changed
- Data sources (cited in full; including unpublished sources and personal communications)
- Name/s and contact details of the assessor/s
- Before inclusion on the IUCN Red List, all assessments will be evaluated by at least two members of a Red List Authority. The Red List Authority is appointed by the Chair of the IUCN Species Survival Commission and is usually a subgroup of a Specialist Group. The names of the evaluators will appear with each assessment.

In addition to the minimum documentation, the following information should also be supplied where appropriate:

- If a quantitative analysis is used for the assessment (i.e. Criterion E), the data, assumptions and structural equations (e.g., in the case of a Population Viability Analysis) should be included as part of the documentation.
- For Extinct or Extinct in the Wild taxa, extra documentation is required indicating the effective date of extinction, possible causes of the extinction and the details of surveys which have been conducted to search for the taxon.
- For taxa listed as Near Threatened, the rationale for listing should include a discussion of the criteria that are nearly met or the reasons for highlighting the taxon (e.g., they are dependent on ongoing conservation measures).
- For taxa listed as Data Deficient, the documentation should include what little information is available.

Assessments may be made using version 2.0 of the software package RAMAS[®] Red List (Akçakaya and Ferson 2001). This program assigns taxa to Red List Categories according to the rules of the IUCN Red List Criteria and has the advantage of being able to explicitly handle uncertainty in the data. The software captures most of the information required for the documentation above, but in some cases the information will be reported differently. The following points should be noted:

- If RAMAS[®] Red List is used to obtain a listing, this should be stated.
- Uncertain values should be entered into the program as a best estimate and a plausible range, or as an interval (see the

RAMAS[®] Red List manual or help files for further details).

- The settings for attitude towards risk and uncertainty (i.e. dispute tolerance, risk tolerance and burden of proof) are all pre-set at a mid-point. If any of these settings are changed this should be documented and fully justified, especially if a less precautionary position is adopted.
- Depending on the uncertainties, the resulting classification can be a single category and/or a range of plausible categories. In such instances, the following approach should be adopted (the program will usually indicate this automatically in the Results window):
 - If the range of plausible categories extends across two or more of the threatened categories (e.g. Critically Endangered to Vulnerable) and no preferred category is indicated, the precautionary approach is to take the highest category shown, i.e. CR in the above example. In such cases, the range of plausible categories should be documented under the rationale including a note that a precautionary approach was followed in order to distinguish it from the situation in the next point. The following notation has been suggested e.g. CR* (CR-VU).
 - If a range of plausible categories is given and a preferred category is indicated, the rationale should indicate the range of plausible categories met e.g. EN (CR-VU).
 - The program specifies the criteria that contributed to the listing (see Status window). However, when data are uncertain, the listing criteria are approximate, and in some cases may not be determined at all. In such cases, the assessors should use the Text results to determine or verify the criteria and sub-criteria met. Listing criteria derived in this way must be clearly indicated in the rationale (refer to the RAMAS[®] Red List Help menu for further guidance on this issue).
 - If the preferred category is indicated as Least Concern, but the plausible

range extends into the threatened categories, a listing of 'Near Threatened' (NT) should be used. The criteria, which triggered the extension into the threatened range, should be recorded under the rationale.

- Any assessments made using this software must be submitted with the RAMAS[®] Red List input files (i.e. the *.RED files).

New global assessments or reassessments of taxa currently on the IUCN Red List, may be submitted to the IUCN/SSC Red List Programme Officer for incorporation (subject to peer review) in a future edition of the *IUCN Red List of Threatened Species*TM. Submissions from within the SSC network should preferably be made using the Species Information Service (SIS) database. Other submissions may be submitted electronically; these should preferably be as files produced using RAMAS[®] Red List or any of the programs in Microsoft Office 97 (or earlier versions) e.g. Word, Excel or Access. Submissions should be sent to:

IUCN/SSC Red List Programme, IUCN/SSC UK Office, 219c Huntingdon Road, Cambridge, CB3 0DL, United Kingdom. Fax: +44-(0)1223-277845; Email: redlist@ssc-uk.org.

For further clarification or information about the IUCN Red List Criteria, documentation requirements (including the standards used) or submission of assessments, please contact the IUCN/SSC Red List Programme Officer at the address shown above.

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Draft Guidelines for the Application of IUCN Red List Criteria at National and Regional Levels

Ulf Gärdenfors (Sweden), Jon Paul Rodríguez (Venezuela), Craig Hilton-Taylor (South Africa), Colleen Hyslop (Canada), Georgina Mace (UK), Sanjay Molur (India) and Stuart Poss (USA)

Background

Red Lists and Red Data Books are among the most widely used conservation tools available to conservationists world wide for focussing attention on species of conservation concern. These publications are essentially catalogues of threatened species where each entry consists of a species and a threatened category that provides an easily and widely understood method for highlighting those species under higher extinction risk. Prior to 1994, the threatened categories used in Red Data Books and Red Lists had been in place, with some modification, for almost 30 years. The need to revise the categories had been recognised since 1984, when the Species Survival Commission (SSC) held a symposium, 'The Road to Extinction' (Fitter and Fitter 1987). However, despite close examination of all the issues, no single revision of the system was proposed. In the early 1990s, The World Conservation Union (IUCN) under the auspices of the SSC, initiated a process for revising the Red List Categories. The main objective of this revision was to increase the objectivity and repeatability of the assessment process, as well as to develop quantifiable criteria that assign categories only on the basis of extinction risk. In 1994, the IUCN Council adopted the new Red List Categories and Criteria (IUCN 1994) which enable the assessment of the extinction risk of species or lower taxa at the global scale. The system was not designed with the intention that it be used at a sub-global level for the assessment of only a portion of the global population of a taxon. However, in many countries and regions, there is a strong desire to produce national or regional Red Lists based on comparable categories and criteria as used at the global level. The problem in applying the global system is that estimating extinction risk in a portion of a species' range may be different from the assessment of extinction risk at a global level, and the direct application of the existing criteria is not always possible.

The regional application issue was discussed at two SSC workshops held in Gland, Switzerland in March 1995 and in Cambridge, England in December 1995 (see Gärdenfors 1995), and by Gärdenfors (1996) and Gärdenfors and Kindvall (1999). It has also been discussed by several authors with reference to particular countries or regions, e.g. Avery *et al.* (1994), de Lange and Norton (1998), Maes and Swaay (1997), Palmer *et al.* (1997), Rodríguez and Rojas-Suárez (1995), Schnittler *et al.* (1994), Swaay *et al.* (1997). Recognising the need for coherent criteria for the application of Red List categories at sub-global scales (e.g. sub-national, national or larger regions), the first World Conservation Congress held in Montreal in 1996, adopted a resolution (WCC Res. D. 1.25) that "Requests the SSC, within available resources, to complete the development of guidelines for using the IUCN Red List Categories at the regional level as soon as it is practicable...".

In 1998, a Regional Application Working Group (RAWG) was formed under the SSC Red List Programme Subcommittee. The first meeting of the RAWG was held in Montreal, Canada in October 1998. This draft of the 'Guidelines for the Application of IUCN Red List Criteria at National and Regional Levels', hereafter referred to as the 'Guidelines', is the result of proposals made at that meeting, subsequent correspondence between members of the group, and comments at training workshops held in Canada and Australia. The Guidelines will be revised by the RAWG following the receipt of comments, a period of testing and a series of regional workshops. The revised Guidelines will also take into account the proposed changes to the Red List Categories and Criteria (Criteria Review Working Group 1999). A final version of the guidelines will be presented to the IUCN Council at the World Conservation Congress in October 2000.

This draft version provides IUCN and SSC

members an opportunity to comment on the Guidelines. We invite people to submit their comments and suggestions for amendments (preferably as well-formulated alternatives) to:

Craig Hilton-Taylor, Red List Programme Officer, IUCN/SSC UK Office, 219c Huntingdon Road, Cambridge, CB3 0DL, United Kingdom. Fax: +44-1223-277845, Email: redlist@ssc-uk.org OR craig.hilton-taylor@ssc-uk.org.

Draft Guidelines

Introduction

The IUCN Red List Categories and Criteria are described in detail in a red booklet published recently (IUCN 1994), and reproduced in Baillie and Groombridge (1996), Oldfield *et al.* (1998) and on the IUCN/SSC web site (<http://iucn.org/themes/ssc/siteindex.htm>). The Guidelines presented below require a thorough knowledge of the definitions and rules of the Red List Categories and Criteria. Familiarity with the publications mentioned above is therefore strongly recommended.

The Guidelines can be applied to any taxonomic unit at or below the species level. The term 'taxon' in the Guidelines is used for convenience, and may represent species or lower taxonomic levels. The term 'region' is also used to denote any sub-global geographical area (e.g. continent, country, state or province).

Summary of the Issues

Provided the regional population to be assessed is isolated from conspecific populations outside the region, the (global) Red List Criteria (IUCN 1994) can be used in a straightforward manner. The extinction risk of such an isolated population is identical to an endemic taxon. In these situations, the criteria can be used with unaltered thresholds at *any* geographical

scale. However, if the criteria are applied to part of a population cut by a geo-political border, or to a regional population occasionally interchanging individuals with other populations beyond the border, the thresholds under Criteria A-D may no longer correspond to the extinction risk expressed in Criterion E.

Within a particular region, there will be a mixture of taxa with different distribution histories, ranging from being indigenous (native to the area) since pre-human settlement to recently and purposefully introduced by people. Besides reproducing taxa, there will also be taxa that do not reproduce in the region but still utilise (and may be dependent upon) resources; they are visitors to the region. There may also be formerly native taxa that are now extinct in the region but which are still extant in other parts of the world. All these situations require recommendations on how they should be handled in regional Red List assessments.

The Red List Categories, whether used at the global or regional level, reflect the extinction risk of a taxon, but not necessarily a particular priority for conservation. This distinction will be even more important to realise and recognise at the regional level where the setting of conservation priorities should be viewed in a larger perspective.

Definitions

Benign Introduction

An attempt to establish a taxon, for the purpose of conservation, outside its recorded distribution but within an appropriate habitat and eco-geographical area (IUCN 1998).

Class I-(III)V of Global Population Share

The proportion of the global population occurring within the study region is measured in three or five classes (see examples in Figure 1). The number of classes chosen is to be decided by regional assessors since the distribution of proportions will vary widely among regions.

Class I, indicates the lowest proportion, and classes III or V the highest. The proportion of total population size may, in the absence of good information, be estimated from known or estimated geographical distribution and/or suitable habitat. The delimitation of the classes will depend on the size of the region (i.e. how large a proportion of the global population of the taxon tend

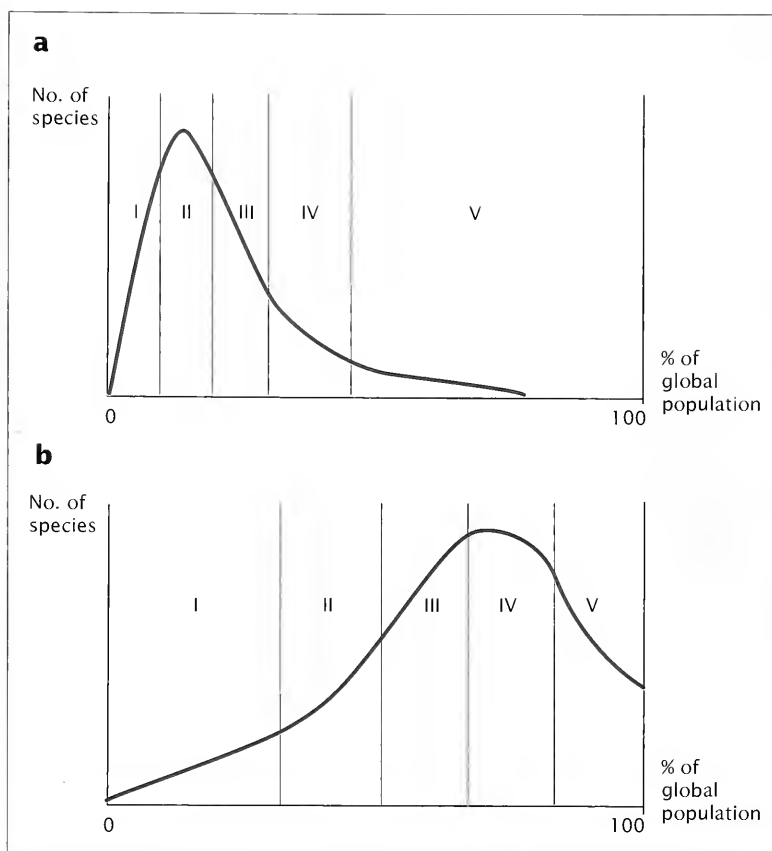


Figure 1: Examples of definitions of classes denoting global population share within two regions of different size. a. In a small region, most species tend to have a small share of the total population, while very few or none are endemic to the region. Therefore, to get an informative delimitation the classes must be skewed towards lower percentages. **b.** In a large region, most of the taxa tend to have a large proportion of the global population and many are endemic. Therefore, the classes must be skewed towards higher percentages. The percentages used to delimit the classes must be clearly stated in the regional Red List.

to occur within the region); and the width of classes need not to be identical. The percentages used to delimit the classes must be clearly stated in the regional Red List.

Conspecific Populations

Populations of the same taxon found in different geographical locations.

Current Range

Present geographical distribution of the taxon.

Downgrading and Upgrading

The process for adjusting the Red List Category of a regional population according to the decreased or increased risk of extinction.

Endemic Taxon

A taxon is endemic to an area if it is found

only there and nowhere else. It is a relative term. A taxon can be endemic to a small island, to a country or a continent.

Global Population

Total number of individuals of the taxon living in the wild.

Isolated Population

A population of the taxon that does not (or only exceptionally) exchange conspecific individuals or gametes with any other populations, and whose expected risk of extinction is therefore unaffected by other populations.

Natural Range

The range of a taxon, *excluding* any portion that is the result of intentional or accidental introductions to the region or a

neighbouring region after the year 1800 or 1900, respectively. Taxa introduced intentionally before 1800 should also have developed local adaptations to be regarded as being within their natural range. The natural range includes areas where the taxon does not breed but regularly utilises resources, such as feeding grounds or watering sites during migration, as well as wintering areas.

Propagule

Any live entity capable of dispersal and of producing a new mature individual, e.g. a spore, seed, fruit, egg, larva, part of or entire individual.

Region

Any sub-global geographical area, such as continent, country, state or province.

Regional Assessment

Process for assessing the extinction risk of a regional population according to the guidelines given here.

Regionally Extinct (RE)

A taxon is Regionally Extinct when there is no reasonable doubt that the last individual potentially capable of reproduction within the region has died or disappeared from the region, or if a former visiting taxon, the last individual has died or disappeared from the region.

Regional Population

The portion of the global population within the area being studied. This may comprise one or more subpopulations.

Rescue Effect

Immigrating propagules result in a lower extinction risk of the target population.

Subpopulations

Subpopulations are defined (IUCN 1994) as geographically or otherwise distinct groups in the global population between which there is little exchange (typically one successful migrant individual or gamete per year or less).

Taxon

Any species or infra-specific taxon whose extinction risk is being assessed.

Vagrant

A taxon that occurs within the boundaries of the region only occasionally or, occurred during the 20th century. The region would therefore only have a very small share of the global population (i.e. Class I). See *Visitor*.

Visitor = Visiting Taxon

A taxon that does not reproduce within the region but regularly occurs within its boundaries. During any considerable period of the 20th century, the share of the global population in the region would have been at least Class II. See *Vagrant*.

Wild Population

A population within its natural range where the individuals are the result of natural reproduction, i.e. not the result of human mediated release, translocation or sowing. If, a population is the result of a benign introduction using individuals genetically similar to the original stock, the population is considered to be wild.

The Assessment

Taxa to be Assessed

The criteria should only be applied to wild populations inside their natural range, and to populations resulting from benign introductions (IUCN 1994). Taxa only marginally within the region should not be precluded from entering the assessment process. However, a taxon that occasionally breeds under favourable circumstances in the region, only to go extinct after a short period, should not be considered for the regional Red List. Similarly, a taxon that is currently expanding its distributional range outside the region and appears to be in a colonisation phase within the region should not be considered for regional assessment until the taxon has reproduced within the region for several years.

Visiting taxa, i.e. taxa not reproducing within the Region but regularly visiting the country as migrants or wintering/summering populations, may be assessed against the Criteria.

The Categories

The IUCN Red List Categories (IUCN 1994) should be used unaltered at regional levels, with two exceptions:

1. Taxa extinct within the region but extant in other parts of the world should be classified as Regionally Extinct (RE). A taxon is Regionally Extinct when there is no reasonable doubt that the last individual potentially capable of reproduction within the region has died or disappeared from the region, or, if a former visiting taxon, no individuals visit the region any more. Populations of long-lived individuals that currently have ceased to reproduce within the region because of poor or insufficient

environmental conditions should not be classified as RE. The rationale behind this is that the environment might change and the remaining individuals might start to reproduce again. The classification of visiting taxa as RE will be determined by the assessors using information from any monitoring efforts devoted to the taxon within the region and the species' known faith to its breeding areas.

2. The category *Extinct in the Wild (EW)* should be assigned only to taxa that are extinct in the wild over their entire natural range, including the region, but extant in cultivation, in captivity, or as a naturalised population (or populations) well outside their historical range. If a taxon is (globally) *EW* but extant in a naturalised population within the region, the regional population should be viewed as result of a benign introduction and, consequently, assessed according to the Red List Criteria.

The Assessment Procedure

The regional assessment should be carried out in a two-step process. For the first step the global criteria are applied to the regional population of the taxon (as specified by IUCN 1994), resulting in a preliminary categorisation. All data used in this initial assessment (e.g. number of individuals and variables relating to area, reduction, decline, fluctuations, subpopulations, locations, fragmentation, etc.) should be from the regional population, not the global population. In the second step, the occurrence of any conspecific populations outside the region that may affect the risk of extinction within the region should be investigated. If the taxon is endemic to the region or the regional population is isolated, the Red List Category defined by the criteria should be adopted unaltered. If, on the other hand, there are conspecific populations outside the region that are judged to affect the regional extinction risk, the regional Red List Category should be changed to a more appropriate level, to reflect the extinction risk as defined by Criterion E (see Figure 2). In most cases, this will mean downgrading the category met by the global criteria, since populations within the region may experience a 'rescue effect' by populations outside the region (Hanski 1991, Hanski and Gyllenberg 1993). In other words, immigration from outside the region will tend to decrease extinction risk within the region. Normally, such a downgrading will involve a one step change in category, e.g. moving the category from *Endangered (EN)* to *Vulnerable*

Table 1. To judge whether any extra-regional populations may effect the extinction risk of the regional population, the check-list in the table below should be considered.

Questions	Comments
<p>Likelihood of propagule migration</p> <p>Are there any conspecific populations outside the region within a distance from which propagules could reach the region? Are there any effective barriers preventing dispersal to and from neighbouring populations? Is the species capable of long-distance dispersal? Is it known to do so?</p>	<p><i>If there are no conspecific populations in neighbouring regions or propagules are not able to disperse to the region, the regional population behaves as an endemic and the category should be left unchanged.</i></p>
<p>Evidence for the existence of local adaptations</p> <p>Are there any known differences in local adaptation between regional and extra-regional populations, i.e. is it probable that individuals from extra-regional populations are adapted to survive within the region?</p>	<p><i>If it is unlikely that individuals from extra-regional populations would be able to survive within the region, the category should be left unchanged.</i></p>
<p>Availability of suitable habitat</p> <p>Are current conditions of habitats and/or other environmental (including climatological) requirements of the taxon in the region such that immigrating propagules are able to successfully establish themselves (i.e. are there inhabitable patches), or has the taxon disappeared from the region because conditions were not favourable?</p>	<p><i>If there is not enough suitable habitat and current conservation measures are not leading to an improvement of the habitat within a foreseeable future, immigration from outside the region will not decrease extinction risk and the category should be left unchanged.</i></p>
<p>Status of extra-regional populations</p> <p>How abundant is the taxon in neighbouring regions? Are the populations there stable, increasing or decreasing? Are there any important threats to those populations? Is it probable that they produce an appreciable amount of emigrants, and will continue to do so for the foreseeable future?</p>	<p><i>If the taxon is more or less common outside the region and there are no signs of population decline and the taxon is capable of dispersing to the region and there is (or soon will be) available habitat, downgrading the category is appropriate. If the taxon is currently decreasing in neighbouring regions, the 'rescue effect' is less likely to occur, hence downgrading the category may not be appropriate.</i></p>
<p>Degree of dependence on extra-regional sources</p> <p>Are extant regional populations self-sustaining (i.e. have they shown a positive reproductive rate over the years) or are they dependent on immigration for long-term survival (i.e. are the regional populations sinks)?</p>	<p><i>If there is evidence that a substantial number of propagules regularly reach the region and the population still has a poor survival, the regional population may be a sink. If so, and there are indications that the immigration will soon cease, upgrading the category may be appropriate.</i></p>

(VU) or from VU to *Lower Risk Near Threatened* (LRnt). For expanding populations, whose global range barely touches the edge of the region, a downgrading of the category by two or more steps may be necessary. Conversely, if the population within the region is a demographic sink (Pulliam 1988) unable to sustain itself without migration from populations outside the region and the extra-regional source is expected to decrease, the extinction risk of the regional population may be underestimated by the criteria. In such exceptional cases an upgrading may be appropriate. If it is unknown whether extra-regional populations influence the extinction risk of the regional population, the precautionary principle should be exercised and the category met by the global criteria

should be kept unaltered.

Adjustments can be made to all the Red List Categories except for *Extinct* (EX), *Data Deficient* (DD), and *Not Evaluated* (NE), which must be used according to the rules (IUCN 1994). *EW* will in most cases be replaced by *RE*, following the section entitled *The Categories* above. The category *RE* should not be downgraded even if there are conspecific populations outside the region that may be the source of later recolonization.

Priorities for Conservation

Assessment of extinction risk and setting conservation priorities are two related but different processes. The assessment of ex-

inction risk (such as the assignment of IUCN Red List Categories) generally precedes priority setting. The purpose of risk assessment is to produce a quantitative estimate of the likelihood of extinction of the taxon. Setting conservation priorities on the other hand often considers extinction risk, but also takes into account many other factors, such as availability of funds or personnel to carry out conservation actions, legal frameworks for conservation of threatened species, or ecological, phylogenetic, historical and cultural preferences for some species over others. In the context of regional risk assessments, there are a number of additional pieces of information that would be valuable for setting conservation priorities. For example, it is important not only to consider conditions

Table 2. Hypothetical Regional Red List showing an example of the potential layout and information to be included.

Taxon name	Regional Red List Category	Global Red List Category	Proportion of Global Population	Documentation and notes
<i>Aus australis</i> (Linnaeus, 1759)	VU A1b	LRlc	II	Andersen (1996) measured a 60% decline in traps since 1985 in southern subpop. Pop. still numerous close to the border: Downgraded from EN.
<i>Bus borealis</i> (Smith, 1954)	LRnt	NE	III	Population estimated at 10-20,000 indiv. and habitat probably decreasing. International distribution poorly known.
<i>Cus communis</i> (Alvarez, 1814)	EN A2c, B1+2c	DD	?	AOO estimated to 200 km ² . The forests currently under high pressure.
<i>Dus domesticus</i> (Liu, 1988)	VU A1b	LRlc	IV	Visitor. Young stages (estimated 30% of world pop.) spend summer months in Blue Bay (Fisheries Dep. 1983). Visiting population has decreased by =20% the last 10 yr.
<i>Eus ephemericus</i> (Szymczak, 1904)	CR C2a, D	VU A1c,e	I	Not seen for last 10 yr. but believed to survive with a small no. of scattered indiv. (Lilliput County board <i>in lit.</i>)
<i>Fus frugivorus</i> (von Schultz, 1805)	VU A2e	LRnt	II	Still numerous and widespread but fungal disease has struck pop. in neighbouring country (Victor 1997). High prob. that the disease will reach our country.

within the region, but also to consider the status of the taxon in a global perspective. This is particularly important in small regions and land-bound countries. Consequently, it is recommended that any publication that results from a regional assessment should include at least three variables: (i) the regional Red List Category, (ii) the global Red List Category and (iii) the proportion of the global population occurring within the region.

The global Red List Category follows the published IUCN Red Lists (currently, Baillie and Groombridge 1996, Walter and Gillett 1998, and Oldfield *et al.* 1998). If a globally red-listed taxon is endemic to the region and the regional assessors come to a different conclusion about the category than the global assessors, the appropriate Red List Authority should be contacted and the status of the taxon re-examined (the exact procedures for this will be announced by SSC in due course). If agreement is reached to change the global assessment, the new global category may be given in the regional Red List even if it will be published before the next update of the global IUCN Red List is due (the latter will be updated annually from 1999). If no agreement is reached, the parties may submit an appeal based on the Red List Criteria for

judgement by the SSC *Red List Programme Standards Working Group*. In both cases, the issues must be documented under the listing for the taxon concerned.

The construction of the global criteria, particularly Criterion A, may in some circumstances lead to cases where a taxon meets the criteria for being red-listed at the global, but not the regional level. Such taxa should be included in the regional Red List, and their regional category denoted as *LRlc*.

The proportion of the global population should be denoted in one of three–five classes (Class I indicating the lowest proportion, III or V the highest). The proportion of total population size may, in the absence of good information, be estimated from known or estimated geographical distribution and/or suitable habitat. The delimitation of the classes will depend on the size of the region (i.e. how large a proportion of the global population of the taxon tend to occur within the region); and the width of classes need not to be identical. An even distribution of number of species assigned to the classes should be aimed at in order to achieve a good resolution of the data. An uncertain classification may be followed by a question mark, e.g. “II?”. If the proportion of the global population is

totally unknown, a question mark “?” should be used. The taxonomic classification level of the taxon, e.g. whether an entire species or a single subspecies (with a more restricted distribution) is considered, will influence the share occurring within a region. The percentages used to delimit the classes must be clearly stated in the regional Red List.

It is left to the regional authorities to judge how the three variables mentioned above (including the different taxonomic levels) should be accounted for in setting conservation priorities. Likewise, as mentioned above, the authorities may want to consider other variables in setting priorities. Such considerations are to a large degree region-specific, therefore they are not covered by the Guidelines.

Documentation and Publication

To facilitate the exchange of information between assessors in different regions and between regional and taxonomic Red List Authorities, it is recommended that all regional (and global) assessment exercises document their assessments in a specified way. The global documentation standards will be published by SSC in due course, but for the interim here are some guidelines for

regional lists:

- An assessment must specify, e.g. in introductory sections in the published Red List, which taxa (organism groups) have been evaluated against the Red List Criteria. This should indicate whether every taxon, or just a fraction of the respective groups have been assessed.
- The scientific names in the Red List should be followed by the author and year of description. Wherever possible, the nomenclature in standard global lists should be followed. Any deviations should be noted and justified. If no standards are available, the taxonomic reference/s used should be cited in full. Synonyms may be given if relevant to the assessment.
- The Red List Categories followed by the criteria and sub-criteria met should be indicated using the English abbreviated forms, even if the Red List is published in a national language other than English.
- Visiting taxa that meet any of the categories LRnt, LRcd, VU, EN, CR, RE, EW, EX or DD, should preferably be listed in a separate section, but if they are included in a list among reproducing taxa, the documentation for the taxa should clearly indicate that they are visitors.
- The rationale (including any assumptions, inferences and projections) and all data used (including e.g. demographic,

distributional, habitat, threat and conservation measures information if appropriate), for applying the criteria should be concisely documented under each taxon. This documentation would also include information about any uncertainties. The reasons for any change in status should also be noted in the documentation, and any downgrading or upgrading clearly indicated.

- All sources of information should be cited in full. If no sources are cited in the documentation, all statements will be attributed to the named assessor/s.
- The names and contact information for all those responsible for assessments should be specified. Similarly, two evaluators appointed by the Red List Authorities to evaluate each assessment should also be named.

A printed regional Red List is recommended to contain at least the columns presented in Table 2.

In addition to a printed Red List, which is normally written in the national language(s), publication on the World Wide Web in English (and the national language) is recommended. The web version could include more extensive documentation, as outlined above, than can be included in printed versions as seen in the example above. Web versions may also include the extensive listing and documen-

tation of taxa assessed as *LRlc*. A publication on the web may become a particularly important tool in the process of transferring information from the regional to the global scale.

Discussion

New Criteria are Needed at Regional Level?

In discussions with people responsible for the preparation of national Red Lists, we have often heard that “it is necessary to change the criteria and thresholds for the IUCN Red List Categories when working at a national level”. Two arguments are given for this opinion: “If we use the IUCN criteria, almost every species will enter the national Red List in a small country, and we do not have enough data for applying the detailed criteria from our country.”

The first argument is partly a misconception and the result of confusion about geographical scale (i.e. area) and problems with divided populations (e.g. by national borders), or confusion of assessing extinction risk (that Red Lists should express) with determining conservation priority (that normally includes additional variables). A general change in thresholds for smaller regions, e.g. higher population numbers and larger areas, and a decrease in population decline values, would lead to an

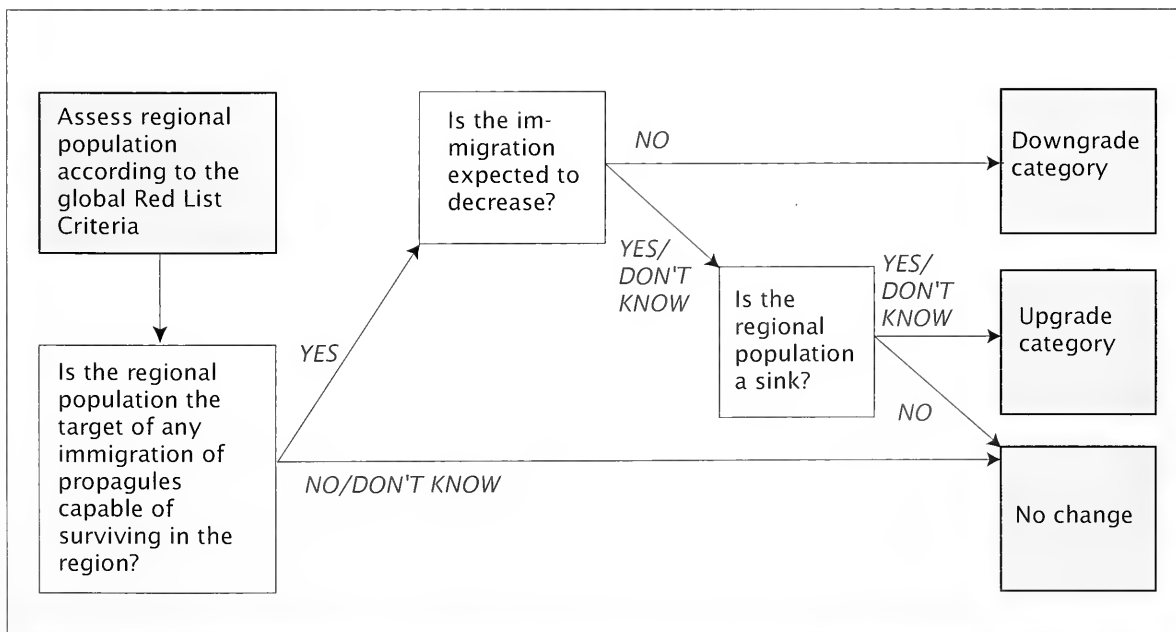


Figure 2. Conceptual scheme of the procedure for assigning an IUCN Red List Category at the regional level. The procedure for assigning the Regionally Extinct category is not included here. See Table 1 for further details on the procedure to be followed, especially in the second step.

underestimation of extinction risk. The only appropriate way therefore is to make a taxon by taxon assessment based on the global criteria and considering whether the respective population is isolated (i.e. behaves as an endemic taxon) or is merely a part of a larger population. The smaller the region, the more common it will be that their populations will be shared with neighbouring countries, requiring an adjustment of the Red List category. The problem may, however, not be as large as first conceived because putative red-listed taxa very often do have a fragmented distribution (reducing interaction between subpopulations) due to habitat destruction. Problems will arise mostly in the cases of highly mobile organisms, such as birds, large mammals, some insects, marine organisms with pelagic stages, and certain lower plants with highly mobile spores. Despite this, one would still expect a higher *percentage* of the taxa occurring in smaller countries to be red-listed. This is because smaller countries have on average smaller populations (fewer locations) and the probability of extinction is generally higher in smaller populations. The second argument, that there is not enough data at the regional level, is generally self-contradictory. It is true, many countries do lack data on distribution, population numbers and trends for their taxa. However, the IUCN Red List Criteria have been successfully applied at the global level (the most data poor of all scales) to over 15,000 taxa (Baillie and Groombridge 1996, Oldfield *et al.* 1998). Most assessors also find that after gaining some experience in applying the criteria, that they can readily be used with a very limited amount of hard data.

Objectivity and Conceptual Difficulties on Regional Levels

The IUCN Categories and Criteria (IUCN 1994) were developed to enhance the objectivity and comparability of Red Lists (Mace and Lande 1991, Mace and Collar 1994, Baillie and Groombridge 1996). Will these Regional Application Guidelines and their recommended two-step procedure (with a possibility to adjust the category first met) result in a less objective categorisation? We think the contrary is true. The assessment in both steps (using the IUCN Red List Criteria and the adjustment procedure) includes subjective evaluations of available data, but both steps have well-defined frames, against which the assessment process is conducted.

At a regional level, the time frame consid-

ered in the risk assessment is more important than at the global level (Gärdenfors 1995, 1996). For instance, a regional extinction may be followed by a later recolonization. Also, at a regional level, a taxon may for example be *EN* according to Criterion E on a 20 yr. time scale (IUCN 1994), while the long-term extinction risk may in fact be less than 50% due to the rescue effects of neighbouring populations (Hanski 1991, Hanski and Gyllenberg 1993). Although the time scale is conceptually important for particular definitions (e.g. Criterion E and the category *RE*), we have largely ignored this issue in the proposed Guidelines. Instead, we have tried to adopt a pragmatic approach, and address, for example, the rescue effect, by suggesting a downgrading of the category. We believe that the resultant problems are more of a conceptual nature than real. In most cases, regional populations disappear because of habitat destruction and no immigrating propagules will rescue the population, or lead to any recolonization.

There is one inconsistency to the downgrading approach suggested in the Guidelines: A downgrading from *RE* to *CR* (or upgrading from *CR* to *RE*) is not recommended. It would be difficult to communicate to the general public that a taxon that no longer occurs in the country is categorised as *CR* or that a still extant species is *RE*.

We have proposed the term *Regionally Extinct*, rather than Extirpated or Vanished, as currently used in some countries. Extirpate literally means a successful eradication conducted on purpose, and that is very rarely the case when a species goes extinct. Also, an abbreviation of Extirpated could easily be confused with *EX*.

Scale of International Comparison

In widely distributed species, there may be marked genetic variation over the range, making an account for the global share within a region less meaningful. Consequently, it could be argued that the continental or a comparable biogeographical scale, would be the most appropriate for comparison, both regarding population proportion and risk of extinction (Gärdenfors 1996). But we have chosen to recommend the global level as the first option, because that geographical scale is always unambiguous and there are few Red Lists available which encompass whole continents (apart from those for Australia and North America). Besides, in the majority

of taxa, the total distribution is restricted to one continent, making little difference to which scale is chosen. However, nothing precludes a region from giving the population share and Red List Category at both the global and continental levels in their Red List.

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APPENDIX 5

The Application of IUCN Red List Criteria at Regional Levels

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Abstract

In 1994, the World Conservation Union (IUCN) adopted new quantitative criteria for the classification of threatened animals and plants in the IUCN Red Lists (IUCN 1994). These Criteria were recently reviewed and some modifications introduced (IUCN 2001). The system, which may be applied to taxonomic units at the species level and below, is designed to reflect relative extinction risk based on information about population size, geographical distribution, known threats, and trends in these measures. The IUCN Red List Criteria have inspired several national and regional authorities to develop similar systems. Unfortunately, when the area is only a portion of a population's entire range, it is not always possible to apply the IUCN criteria, because the quantitative criteria when applied di-

rectly to regional populations may produce misleading results. Here we present some guidelines that have been developed to allow use of the IUCN system at a national and regional level in a way that is (1) complementary to the global listing process and (2) will lead to realistic assessments of extinction risk at the regional or national level. We propose a two-step process. First, the taxon is examined against the Criteria as if it were an isolated population, and a preliminary Red List Category is assigned. Second, interactions with populations in neighboring political jurisdictions are considered, and, the category can be adjusted as appropriate to account for the effect of these interactions. Once the Red List Category, which is directly related to extinction risk, has been determined, conservation priorities for these taxa can be established by the relevant national or regional

process. We recommend that (1) the IUCN Red List Category of the global population and the (2) proportion of the global population occurring within the region should be considered in the priority-setting process and that this information should be presented in the regional Red List.

Keywords: Extinction risk, conservation priority, national, migration, rescue effect

Introduction

Red Lists and Red Data Books are among the most widely used tools available to conservationists worldwide for focusing attention on species of conservation concern. Prior to 1994, the threatened categories used in Red Data Books and Red Lists had been in place, with some modification, for almost 30 years. In the late 1980s, The

World Conservation Union (IUCN), under the auspices of the Species Survival Commission (SSC), initiated a process for revising the IUCN Red List Categories. The aim of this revision was to improve the objectivity and repeatability of the assessment process, as well as to develop quantitative criteria that assigned species to categories on the basis of their relative extinction risk. In 1994, the IUCN Council adopted new Red List Categories and Criteria (IUCN 1994), which enabled the assessment of the extinction risk of species or lower taxonomic units at the global scale. The most recent version of the criteria can be found in IUCN (2001) or on the Internet, at <http://www.iucn.org/themes/ssc/redlists/RLcategories2000.html>, and are briefly outlined in Figure 1.

The IUCN Red List Criteria have inspired several national and regional authorities to develop similar systems. IUCN is keen to support and encourage regional (here used to include any sub-global level) listings. Such lists are often linked to actions at national levels and also provide the global listing and action processes with valuable information. Our goal to have mutual benefits between national/regional and global Red Lists will be more easily achieved with greater consistency in the application of the criteria (Rodríguez et al 2000; Hilton-Taylor et al 2000). Here, we present some guidelines to improve both consistency and the validity of sub-global assessments.

Provided the regional population to be assessed is isolated from conspecific populations outside the region, the (global) IUCN Red List Criteria (IUCN 2001) can be used without modification. The extinction risk of such an isolated population is identical to an endemic taxon, and in these situations, the criteria can be used with unaltered thresholds at *any* geographical scale. However, when the criteria are applied to part of a population defined by a geo-political border, or to a regional population occasionally interchanging individuals with other populations beyond the border, the thresholds listed under each criterion will be incorrect since the unit being assessed is not the same as the actual population. As a result the estimate of extinction risk will be inaccurate.

Within any region, there will be taxa with different distribution histories, ranging from those that are indigenous (native to the area) since pre-human settlement to those recently introduced by people. There may also be breeding and non-breeding

taxa. The latter are those that do not reproduce in the region but still utilize (and may be dependent upon) its resources. There may also be formerly native taxa that are now extinct in the region but which are still extant in other parts of the world (Gärdenfors 1995; 1996). Here we present proposals for consistent listings of all these situations.

A first attempt to resolve these issues was made by the Regional Application Working Group (RAWG), formed under the SSC Red list Programme Subcommittee (Gärdenfors *et al.* 1999). Since then we have received many comments and suggestions and have also tested the principles in a number of real situations (Gärdenfors 2001). The draft that follows incorporates many amendments and we are seeking further comments and suggestions. A final revision of the guidelines will be tested at regional workshops and then recommended for adoption by the IUCN Species Survival Commission during 2002.

Definitions

Benign Introduction

An attempt to establish a taxon, for the purpose of conservation, outside its recorded distribution, but within an appropriate habitat and eco-geographical area. This is a feasible conservation tool only when there is no remaining area left within a taxon's historic range (from IUCN 1998).

Conspecific Populations

Populations of the same species, here applied to any taxonomic unit at or below the species level.

Current Range

The present geographical distribution of the taxon.

Downgrading and Upgrading

The process for adjusting the Red List Category of a regional population according to a decreased or increased risk of extinction. Downgrading refers to a reduced extinction risk and upgrading to an increased extinction risk.

Endemic Taxon

A taxon is endemic to an area if it is naturally found only there and nowhere else. It is a relative term. A taxon can be endemic to a small island, to a country or to a continent.

Global Population

The total number of individuals of the

taxon. See *Population*.

Natural Range

The range of a taxon, *excluding* any portion that is the result of introduction to the region or a neighboring region after the year 1800. Taxa introduced before 1800 should also have developed local adaptations to be regarded as being within their natural range. The natural range includes areas where the taxon does not breed but regularly utilizes resources, such as feeding grounds or watering sites during migration and other areas occupied during nonbreeding periods.

Population

The term *Population* is used in a specific sense in the IUCN Red List Criteria (IUCN 2001) that is different to its common biological usage. Thus, *Population* is defined as the total number of individuals of the taxon. Within the context of a Regional Assessment, however, it may be advisable to use under the same definition, the term *Global Population* rather than *Population*. In these Regional Guidelines we use the term *population*, for convenience, when general reference is made to a group of individuals of a given taxon that may or may not interchange propagules with other such entities. See *Regional population* and *Subpopulation*.

Propagule

Any live entity capable of dispersal and of producing a new mature individual, e.g., a spore, seed, fruit, egg, larva, part of or entire individual.

Region

Any sub-global geographical area, such as continent, country, state or province.

Regional Assessment

The process for assessing the relative extinction risk of a regional population according to the guidelines given here.

Regionally Extinct (RE)

A taxon is *Regionally Extinct* when there is no reasonable doubt that the last individual potentially capable of reproduction within the region has died or disappeared from the region, or, if a former visiting taxon, the last individual has died or disappeared from the region.

Regional Population

The portion of the global population within the area being studied. This may comprise one or more subpopulations.

Rescue Effect

The process by which immigrating propagules result in a lower extinction risk of the target population.

Subpopulation

Subpopulations are defined (IUCN 2001) as geographically or otherwise distinct groups in the (global) population between which there is little demographic or genetic exchange (typically one successful migrant individual or gamete per year or less). A subpopulation may or may not be restricted to a Region.

Taxon

Any species or infra-specific taxon whose extinction risk is being assessed.

Vagrant

A taxon that currently is found only very occasionally within the boundaries of the region. The region would therefore only have a very small share of the global population. See *Visitor*.

Visitor = Visiting Taxon

A taxon that does not reproduce within the region but regularly occurs within its boundaries either now or during some period of the last century. Visitors are distinguished from *vagrants* (see above) by a pre-set limit on the proportion (current or during any considerable period of the last cen-

tury) of the global population involved. The limit is decided by those responsible for the regional Red List process.

Wild Population

A population within its natural range where the individuals are the result of natural reproduction, i.e., not the result of human-mediated release or translocation. If a population is the result of a benign introduction that is now, or has previously been successful (i.e. selfsustaining), the population is considered to be wild.

The Assessment

Taxa to be Assessed

The categorisation process should only be applied to wild populations inside their natural range, and to populations resulting from benign introductions (IUCN 2001). Taxa only marginally within the region should also enter the assessment process. However, a taxon that occasionally breeds under favorable circumstances in the region but then regularly becomes (regionally) extinct should not be considered because it is not within its' natural range following our definitions. Similarly, a taxon that is currently expanding its distributional range outside the region and appears to be in a colonization phase within the region should not be considered for regional assessment until the taxon has re-

produced within the region for several years (typically at least for 10 consecutive years or three generations, whichever is the longer).

Visiting taxa, i.e., taxa not reproducing within the region but regularly visiting the area as migrants or wintering/summering populations, may be assessed against the Criteria. Vagrant taxa should, however, not be assessed.

The Categories

The IUCN Red List Categories (IUCN 2001) should be used unaltered at regional levels, with three exceptions or adjustments:

1. Taxa extinct within the region but extant in other parts of the world should be classified as *Regionally Extinct (RE)*. A taxon is *RE* when there is no reasonable doubt that the last individual potentially capable of reproduction within the region has died or disappeared from the region, or, if considering a former visiting taxon, if individuals no longer visit the region.

Populations of long-lived individuals that have ceased to reproduce within the region (for example as a result of a deteriorating environment) should be regarded as potentially capable of reproduction and, consequently, not be classified as *RE*. The rationale behind this is that the environment may improve leading to a resumption of reproduction by the remaining individuals. On the other hand, vagrant individuals of a formerly regionally breeding taxon that reach the Region should not be regarded as potentially capable of reproduction. The classification of visiting taxa as *RE* will be determined by the assessors using information from monitoring efforts devoted to the taxon within the region, the taxon's known status, and environmental conditions in its non-breeding as well as breeding areas.

2. The category *Extinct in the Wild (EW)* should be assigned only to taxa that are extinct in the wild over their entire natural range, including the region, but extant in cultivation, in captivity, or as a naturalized population (or populations) well outside the past range. If a taxon is (globally) *EW* but extant in a naturalized population within the region, the regional population should be viewed as the result of a benign introduction and, consequently, assessed according to the Red List Criteria.

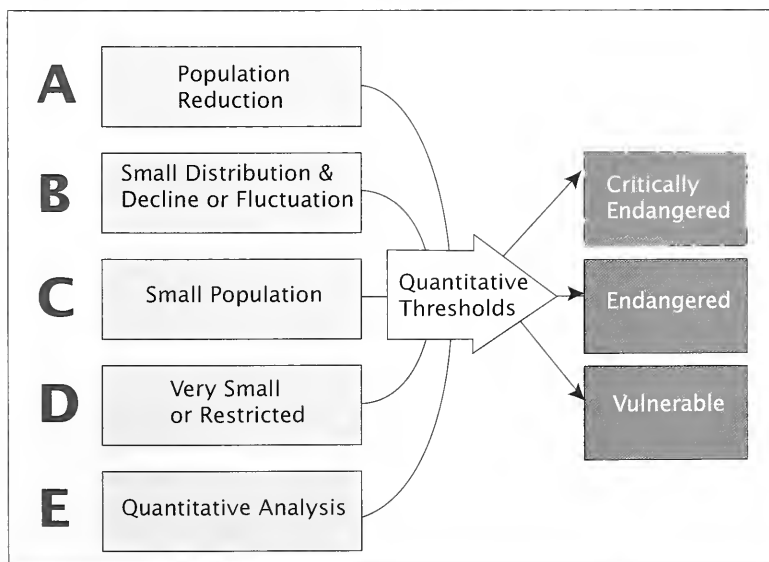


Figure 1. Summary outline of the IUCN Red List Criteria (A-E) for the categories Critically Endangered (CR), Endangered (EN) and Vulnerable (VU) according to IUCN (2001). For determining these categories, at least one should be met for assigning a species. The full system (see: <http://www.iucn.org/themes/ssc/redlists/RLcategories2000.html>) must be consulted for any application, since it is more complex with subcriteria and numerical thresholds not included here.

3. The category *Not Evaluated* (NE) will be assigned to two kinds of taxa: (i) Those that have not yet been evaluated, e.g., due to lack of personnel or monetary resources (this is the general definition of NE at the global level). (ii) Those (mainly introduced taxa and vagrants) that are not eligible for assessment at a regional level and, consequently, have not been evaluated.

The Assessment Procedure

The regional assessment should be carried out in a two-step process (Fig. 2 and Table 1). In the first step the global IUCN Red List Criteria are applied to the regional population of the taxon (as specified by IUCN 2001), resulting in a preliminary categorisation. All data used in this initial assessment (e.g. number of individuals and variables relating to area, reduction, decline, fluctuations, subpopulations, locations, fragmentation, etc.) should be from the regional population, not the global population. In the second step, the existence and status of any conspecific populations outside the region that may affect the risk of extinction within the region should be investigated. If the taxon is endemic to the region or the regional population is isolated, the Red List Category defined by the Criteria should be adopted unaltered. If, on the other hand, there are conspecific populations outside the region that are judged to affect the regional extinction risk, the regional Red List Category should be changed to a more appropriate level, to reflect the extinction risk as defined by Criterion E (see Fig. 1). In most cases, this will mean downgrading the category met by the

global Criteria, since populations within the region may experience a 'rescue effect' from populations outside the region (Brown & Kodric-Brown 1977; Hanski & Gyllenberg 1993). In other words, immigration from outside the region will tend to decrease extinction risk within the region. Normally, such a downgrading will involve a one step change in category, e.g., moving the category from *Endangered* (EN) to *Vulnerable* (VU), or from VU to *Near Threatened* (NT). For expanding populations, whose global range barely touches the edge of the region, a downgrading of the category by two or even more steps may be appropriate. Conversely, if the population within the region is a demographic sink (Pulliam 1988) unable to sustain itself without migration from populations outside the region and the extra-regional source is expected to decrease, the extinction risk of the regional population may be underestimated by the criteria. In such exceptional cases an upgrading of the category may be appropriate. If it is unknown whether extra-regional populations influence the extinction risk of the regional population, the global criteria should be kept unaltered.

Adjustments can be made to all the Red List Categories except for *Extinct* (EX), *Extinct in the Wild* (EW), *Regionally Extinct* (RE), *Data Deficient* (DD), and *Not Evaluated* (NE), which cannot be up- or downgraded.

Visiting taxa may be assessed against the IUCN Red List Criteria. Note the distinction between a visitor and a vagrant, since the latter cannot be assessed. The lower

limit in global population share for being defined as a visitor should be decided by the regional authority, but will normally be within the interval of 5–15%. All data used in the assessment, such as population size and the area of occupancy in the target region, should pertain to the visiting individuals only. However, it may be essential to examine the conditions in the breeding area to be able to interpret the nature of changes in area used by visitors. For instance, a projected or suspected population size reduction (criterion A3 or A4) may be based not only on changing conditions in the area used by visitors but also in the breeding area. It is also essential to distinguish true population changes and fluctuations from transient changes, which may be due to unsuitable weather or other factors, resulting in visitors temporarily favoring other regions. The extent of occurrence, as well as the area of occupancy, may change considerably from year to year. It is then appropriate to use a lower estimate, which will in most cases be closer to the mean than the lowest recorded estimate.

Priorities for Conservation

Assessment of extinction risk and setting conservation priorities are two related but different processes. The assessment of extinction risk (such as the assignment of IUCN Red List Categories) generally precedes priority setting. The purpose of the Red List categorisation is to produce a relative estimate of the likelihood of extinction of the taxon. Setting conservation priorities, on the other hand, often considers ex-

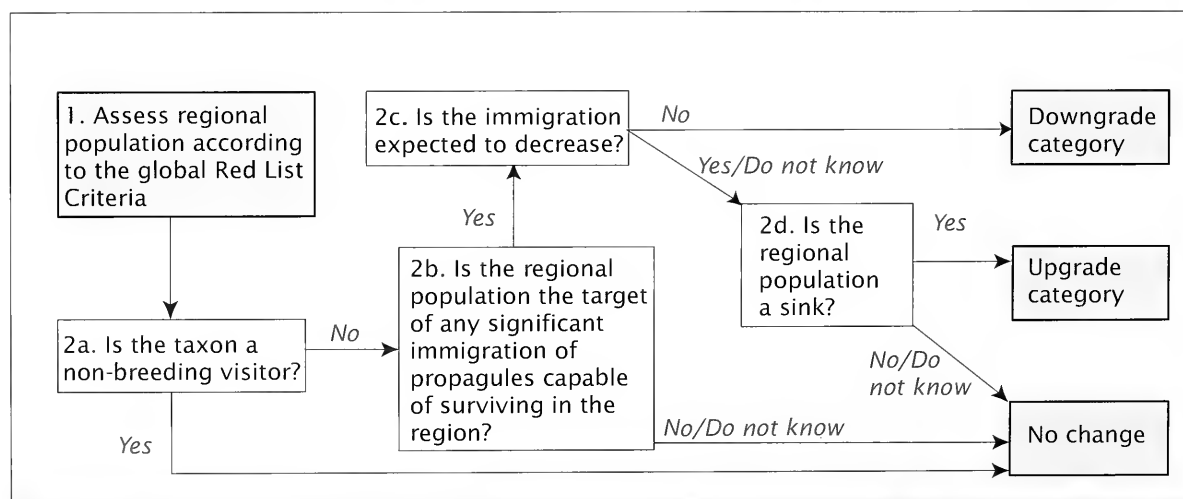


Figure 2. Conceptual scheme of the procedure for assigning an IUCN Red List Category at a regional level. In step number 1 all data used should be from the regional population, not the global population. The procedure for assigning the *Regionally Extinct* category is not included here. See Table 1 for further details on the procedure to be followed, especially in the second step.

tion risk, but also takes into account many other factors, such as availability of funds or personnel to carry out conservation actions, legal frameworks for conservation of threatened taxa, or ecological, phylogenetic, historical, and cultural preferences for some taxa over others. In the context of regional risk assessments, there are a number of additional pieces of information that would be valuable for setting conservation priorities. For example, it is important not only to consider conditions within the region, but also to consider the status of the taxon in a global perspective. This is particularly important in small regions and mid-continental countries. Consequently, it is recommended that any publication that results from a regional assessment should include at least three meas-

ures: (i) the regional Red List Category, (ii) the global Red List Category and (iii) an estimate of the proportion (%) of the global population occurring within the region. If the proportion of the global population is totally unknown, a question mark '?' should be used. The taxonomic classification level of the taxon, e.g., whether an entire species or a single subspecies (with a more restricted distribution) is considered, will influence the share occurring within a region.

It is left to the regional authorities to judge how the three variables (i-iii), as well as different taxonomic levels, should be used when setting conservation priorities. Likewise, as mentioned above, the authorities may wish to consider other variables in set-

ting priorities. Such considerations are to a large degree region-specific; therefore they are not covered by the Guidelines.

Documentation and Publication

To facilitate the exchange of information between assessors in different regions and between regional and taxonomic Red List Authorities, it is recommended that all regional (and global) assessment exercises document their assessments in a specified way. The global documentation standards (IUCN 2001, Annex 2-3) should be followed.

The introductory sections should include a list of the taxonomic groups that have been evaluated against the Red List Criteria.

Table 1. To judge whether any extra-regional populations may affect the extinction risk of the regional population, the checklist in the table below should be considered. Compare Figure 2.

Questions	Comments
2a. Is the taxon a non-breeding visitor? Is the taxon reproducing within the region or is it merely a visitor utilizing resources within the region?	<i>If the answer to the headline question is both yes and no, i.e., there are two distinct subpopulations with one being a non-reproducing migrant and the other being a reproducing subpopulation, then each subpopulation should be treated as different taxa and be assessed separately.</i>
2b. Likelihood of propagule migration Are there any conspecific populations outside the region within a distance from which propagules could reach the region? Is the regional population part of a larger metapopulation involving extra-regional patches? Are there any effective barriers preventing dispersal to and from neighbouring populations? Is the taxon capable of long-distance dispersal? Is it known to do so?	<i>If there are no conspecific populations in neighboring regions or propagules are not able to disperse to the region, the regional population behaves as an endemic and the category should be left unchanged.</i>
2b. Evidence for the existence of local adaptations Are there any known differences reflecting local adaptations between regional and extra-regional populations, i.e., is it probable that individuals from extra-regional populations are adapted to survive within the region?	<i>If it is unlikely that individuals from extra-regional populations would be able to survive within the region, the category should be left unchanged.</i>
2b. Availability of suitable habitat Are current conditions of habitats and/or other environmental (including climatological) requirements of the taxon in the region such that immigrating propagules are able to successfully establish themselves (i.e. are there habitable patches?), or has the taxon disappeared from the region because conditions were not favourable?	<i>If there is not enough suitable habitat and current conservation measures are not leading to an improvement of the habitat within a foreseeable future, immigration from outside the region will not decrease extinction risk and the category should be left unchanged.</i>
2c. Status of extra-regional populations How abundant is the taxon in neighboring regions? Are the populations there stable, increasing or decreasing? Are there any important threats to those populations? Is it probable that they produce an appreciable amount of emigrants, and will continue to do so for the foreseeable future?	<i>If the taxon is more or less common outside the region and there are no signs of population decline and the taxon is capable of dispersing to the region and there is (or soon will be) available habitat, downgrading the category is appropriate. If the taxon is currently decreasing in neighbouring regions, the 'rescue effect' is less likely to occur hence downgrading the category may not be appropriate.</i>
2d. Degree of dependence on extra-regional sources Are extant regional populations self-sustaining (i.e. have they shown a positive reproductive rate over the years) or are they dependent on immigration for longterm survival (i.e. are the regional populations sinks)?	<i>If there is evidence that a substantial number of propagules regularly reach the region and the population still has a poor survival, the regional population may be a sink. If so, and there are indications that the immigration will soon cease, upgrading the category may be appropriate.</i>

A printed regional Red List should present at least the scientific name and the authorship of the taxon, the regional Red List Category (using the English abbreviated forms) and Criteria, the global IUCN Red List Category and Criteria, and the proportion (%) of the global population occurring within the region. If possible, the vernacular name (in the national language) and a short summary of the documentation of the taxon should also be included. Visiting taxa that meet any of the categories *NT*, *VU*, *EN*, *CR*, *RE*, *EW*, *EX* or *DD* should preferably be listed in a separate section, but if they are included in a list of breeding taxa, it should clearly indicate that they are visitors.

The global Red List Category should follow published IUCN Red Lists (currently, Hilton-Taylor 2000 and Walter & Gillett 1998). If a globally red-listed taxon is endemic to the region and the regional assessors have come to a different conclusion about the category than the global assessors (e.g., see Rodriguez *et al.* 2000; Hilton-Taylor *et al.* 2000), the IUCN Red List Office (redlist@ssc-uk.org) should be contacted with a request that the status of the taxon be re-examined by the designated Red List Authority. (i) If agreement is reached to change the global assessment, the new global category may be given in the regional Red List even if it will be published before the next update of the global IUCN Red List (the latter will be updated annually from 2002). (ii) If no agreement is reached, the regional authority may submit an appeal based on the IUCN Red List Criteria for judgment by the SSC *Red List Programme Standards and Petitions Subcommittee*. (iii) If no conclusion is reached before the finalization of the regional Red List, the category according to the regional assessment may be used as the regional category, and the IUCN global Red List category should be used in the global category position. In all three cases, the issues must be documented under the listing for the taxon concerned.

The application of the global criteria, particularly Criterion A, may under some circumstances lead to the situation where a taxon qualifies for listing at the global, but not the regional level. This may be the case when the regional population is stable but constitutes only a small percentage of the global population, which is experiencing a net decline. Such taxa should be included (in the main list or in an annex) in the regional Red List and their regional category denoted as *LC*.

In addition to a printed Red List, which is normally written in the national language(s), publication on the Internet in English (and the national language) is recommended. The web version could include the full documentation (according to IUCN 2001, Annex 3), which could be difficult in the printed version (unless published as a full Red Data Book). A Web version may also include the extensive listing and documentation of taxa assessed as *LC*. A publication on the web may be a particularly important tool in the process of transferring information from the regional to the global scale (Rodríguez *et al.* 2000).

Discussion

New Criteria at Regional Level?

In discussions with those responsible for the preparation of national Red Lists, we have often heard that 'the criteria and the thresholds for the IUCN Red List Categories should be changed for application at a national level'. Two justifications are given for this opinion: 'If we use the IUCN criteria, almost every species will enter the national Red List in a small country' and, 'we do not have enough data for applying the detailed criteria from our country'.

The first justification is partly due to a confusion between the effect of geographical scale (extinction risk is correlated to the size of the population but not to the size of the country) and issues arising from national borders dividing a population. National boundaries are often irrelevant for populations so a taxon inhabiting a small country does not have a high extinction risk when the global population is considered (not just the fragment of the population which occurs in the country in question). This view also results from confusing the assessment of extinction risk (the role of Red Lists) with the setting of conservation priorities (normally including consideration of additional variables such as political or social factors).

A general change in thresholds for smaller regions, e.g., higher population numbers and smaller areas, and a decrease in population decline values, would lead to an underestimation of extinction risk. Therefore the appropriate method is to make a taxon-by-taxon assessment based on the global IUCN Red List Criteria and then consider whether the population is isolated (i.e. behaves as an endemic taxon) or is part of a larger population. The smaller the region, the more common it will be that

populations are shared with neighboring countries, and hence designation of a Red List category will require consideration of the population as a whole. The problem may, however, not be as serious as it first appears because putative red-listed taxa very often do have a fragmented distribution (reducing interaction between subpopulations) due to habitat destruction. Hence, a well defined subpopulation may often exist within a single country.

Problems will arise mostly in the cases of highly mobile organisms, such as birds, large mammals, some insects, marine organisms with pelagic stages, and certain lower plants with highly mobile spores. Despite this, one would still expect a higher percentage of the taxa occurring in smaller countries to be red-listed. This is because smaller countries have on average smaller populations (fewer locations) and the probability of local extinction is generally higher in smaller populations.

The second statement, that there is not enough data at the regional level, is generally not a significant issue. It is true that many countries do lack precise data on distribution, population numbers and trends for their taxa. However, the criteria do not require precise information – generally the assessor simply has to determine whether the value lies above or below some threshold levels. In fact, the IUCN Red List Criteria have been successfully applied at the global level (the most data poor of all scales) to over 15,000 taxa (Hilton-Taylor 2000). Most assessors also find that after gaining some experience in applying the criteria, they can readily be used with a quite limited amount of precise information.

Visiting Taxa

The quality of the habitat in areas occupied during non-breeding periods may be essential for the survival of a species. Consequently, we think that it is important to include assessments of visiting species in national and regional Red List assessments. However, this has rarely been attempted in the past and so there is little relevant experience. The IUCN Red List Criteria were developed to produce a categorisation correlated to risk of extinction. Whether the same criteria can be used for a non-reproducing phase of a population still remains to be thoroughly tested and evaluated. This includes evaluation and conceptual work on whether there are situations when it would be appropriate to apply the adjusting step for visiting populations.

Objectivity and Conceptual Difficulties on Regional Levels

The IUCN Red List Categories and Criteria (IUCN 1994; 2001) were developed to enhance the objectivity and comparability of Red Lists (Mace & Lande 1991; Mace & Collar 1994; Baillie & Groombridge 1996). Will these Regional Application Guidelines and the recommended two-step procedure still result in an objective categorisation? We believe so. The assessment in both steps (using the IUCN Red List Criteria and the adjustment procedure) includes subjective evaluations of available data, but both steps have welldefined frames, against which the assessment process is conducted.

The time frame considered in the risk assessment is more important at regional than global level (Gärdenfors 1995; 1996). For instance, a regional extinction may be followed by a later recolonization. This effect will be even more pronounced for visiting taxa. Also, at a regional level, a taxon may be *EN* according to Criterion E on a 20 year time scale (IUCN 2001), while the long-term extinction risk may be less due to the rescue effects of neighboring populations. Although the time scale is conceptually important for particular definitions (e.g. Criterion E and the category *RE*), we have largely ignored this issue in the proposed Guidelines. Instead, we have tried to adopt a pragmatic approach, and address, for example, the rescue effect, by suggesting a downgrading of the category. We believe that any resulting difficulties are more of a conceptual nature than real. In most cases, regional populations disappear because of habitat destruction and no immigrating propagules will rescue the population, or lead to any recolonization.

We have proposed the term *Regionally Extinct*, rather than Extirpated or Vanished, as currently used in some countries. Extirpation literally means a successful eradication conducted on purpose, and that is hardly ever the cause of an extinction. Also, an abbreviation of Extirpated could easily be confused with *EX*. Besides *RE*, some people have requested a category like 'Regionally Extinct in the Wild'. We believe that this would not be very informative since *RE* already implies that the taxon is extant elsewhere in the world. The creation of yet another category could create more complexity to the system. Indeed, the comparative complexity already encompassed in the system makes it a challenge to communicate and explain it to persons compiling national and other regional Red Lists.

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Family names appear in capital letters; italics denote synonyms.

A

Acacia adenocalyx 165
Acacia chariessa 174
Acacia exuvialis 165
Acacia hebeclada 19, 20, 79, 90, 165
Acacia mellifera 79
Acacia montis-usti 79
Acacia nebrownii 79
Acacia permixta 165
Acacia robyniana 79
Acacia senegal 79
Acacia torrei 51
Acalypha dikuluensis 151
Acalypha sp. 57
ACANTHACEAE 19, 34, 49, 54, 56, 64, 73, 86, 124, 127, 130, 149, 161, 171, 178
Acanthopale pubescens 178
Acanthosicyos horridus 78, 100
Acanthosicyos naudinianus 78, 163
Acmadenia alternifolia 103
Acmadenia argillophila 103
Acmadenia baileyensis 120
Acmadenia candida 103
Acmadenia densifolia 115
Acmadenia faucitincta 103
Acmadenia gracilis 103
Acmadenia kiwanensis 103
Acmadenia latifolia 103
Acmadenia laxa 103
Acmadenia macradenia 103
Acmadenia macroptala 103
Acmadenia maculata 115
Acmadenia matroosbergensis 115
Acmadenia mundiana 115
Acmadenia nivea 103
Acmadenia nivenii 103
Acmadenia patentifolia 115
Acmadenia rupicola 103
Acmadenia tenax 115
Acmadenia tetragona 115
Acridocarpus natalicus 166
Acrolophia barbata 112
Acrolophia bolusii 112
Acrolophia capensis 112
Acrolophia lunata 112
Acrolophia micrantha 112
Acrolophia ustulata 112
Acrostichum aureum 168
Acrotome thorncroftii 128
Actinoschoenus repens 150
Adenandra dahlgenii 115
Adenandra gracilis 103
Adenandra gummiifera 115
Adenandra marginata 115
Adenandra multiflora 120
Adenandra odoratissima 103
Adenandra rotundifolia 115
Adenandra schlechteri 103
Adenandra villosa 103
Adenia cissampeloides 147
Adenia erecta 143
Adenia fruticosa 168
Adenia hastata 133
Adenia karibaensis 175
Adenia mossambicensis 51
Adenia ovata 147
Adenia pechuellii 71
Adenia repanda 82, 147
Adenia spinosa 168
Adenia tuberifera 143
Adenia zambeziensis 51
Adenium boehmianum 18, 74
Adenium multiflorum 124, 140, 162
Adenium obesum 162
Adenium oleifolium 18, 86
Adenium swazicum 54, 124
Adenoglossa decurrens 109
Adenolobus pechuellii 79
Adenopodia schlechteri 58
Adiantum confine 37
Adiantum reniforme 37
Adromischus schultzeanus 88
Aeollanthus namibensis 90
Aeollanthus neglectus 81

Aeollanthus viscosus 57
Aerangis distincta 37
Aerangis kotschyana 166
Aerangis rusitensis 166
Aerangis splendida 37
Aerangis verdickii 166
Aeranthus africana 166
Aeranthus parkesii 166
Aeschynomene aphylla 58, 174
Aeschynomene bracteosa 151
Aeschynomene chimanimaniensis 174
Aeschynomene gazensis 174
Aeschynomene grandistipulata 174
Aeschynomene inyangensis 174
Aeschynomene lateritica 141
Aeschynomene pseudoglabrescens 145
Aeschynomene stipulosa 141
Aeschynomene tenuirama 36
Aeschynomene venulosa 141
Aframmi longiradiatum 140
Afzella bipindensis 141
Afzella quanzensis 36, 54, 174
Agathosma abrupta 115
Agathosma acutissima 115
Agathosma adenandriifolia 115
Agathosma adnata 116
Agathosma affinis 116
Agathosma alaris 120
Agathosma asperifolia 103
Agathosma bicolor 116
Agathosma canaliculata 103
Agathosma capitata 103
Agathosma cephalodes 104
Agathosma citradora 104
Agathosma collina 104
Agathosma concava 116
Agathosma conferta 104
Agathosma cordifolia 116
Agathosma corymbosa 104
Agathosma decurrens 104
Agathosma dentata 104
Agathosma dielsiana 116
Agathosma digitata 104
Agathosma distans 104
Agathosma dregeana 104
Agathosma elata 104
Agathosma eriantha 104
Agathosma florida 116
Agathosma florulenta 116
Agathosma foetidissima 116
Agathosma foleynana 116
Agathosma geniculata 104
Agathosma glabrata 104
Agathosma glandulosa 104
Agathosma gnidiflora 104
Agathosma hispida 104
Agathosma involucreta 104
Agathosma lancifolia 104
Agathosma leptospermoides 116
Agathosma linifolia 116
Agathosma longicornu 116
Agathosma maculata 104
Agathosma marifolia 104
Agathosma martiana 116
Agathosma minuta 104
Agathosma muirii 104
Agathosma namaquensis 116
Agathosma orbicularis 104
Agathosma ovata 26, 116
Agathosma pallens 104
Agathosma parvipetala 104
Agathosma pattisoniae 104
Agathosma philipsii 104
Agathosma planifolia 116
Agathosma propinqua 104
Agathosma pulchella 104
Agathosma robusta 104
Agathosma rotundifolia 104
Agathosma rubricaulis 104
Agathosma sabulosa 120
Agathosma salina 104
Agathosma scaberula 116
Agathosma sedifolia 104
Agathosma serpyllacea 116
Agathosma spinosa 104
Agathosma squamosa 116
Agathosma stenopetala 104
Agathosma stenosepala 116
Agathosma stokoei 116

Agathosma subteretifolia 104
Agathosma thymifolia 105
Agathosma trichocarpa 105
Agathosma umbonata 105
Agathosma unicarpellata 116
Agathosma viviersii 105
Agathosma williamsii 105
Agathosma zwartbergense 105
Agathosma sp. 120
Agelanthus discolor 81
Agelanthus igneus 54
Agelanthus pungu 81
Agelanthus terminaliae 81
Ageratinastrum palustre 140
Agrostis subulifolia 30
AIZOACEAE 20, 74, 86, 95, 107, 118.
 See also MESEMBRYANTHEACEAE
Aizoanthemum dinteri 74
Aizoanthemum galenoides 74
Aizoanthemum membrum-connectens 74
Aizoon giessii 74
ALANGIACEAE 161
Alangium chinense 161
Albizia antunesiana 79
Albica karasbergensis 90
Albica reflexa 90
Alchornea hirtella 173
Alciope lanata 118
Alectra glandulosa 148
Alectra pseudobarleriae 92
Alectra pubescens 148
Alepidia amatymbica 25, 162
Alepidia parva 127
Aleuritopteris welwitschii 168
Alinula malawica 41, 150
ALLIACEAE 86
Allopassine laurifolia 131
Alloeochoete geniculata 40
Alloeochoete gracillima 40
Alloeochoete oreogena 37
Allophylus chaenostachys 126, 169
Allophylus chirindensis 60, 169
Allophylus mossambicensis 52
Allophylus torrei 55
ALOACEAE 27, 28, 34, 39, 54, 56, 95, 107, 118, 124, 127, 130, 161, 171, 178.
 See also ASPHODELACEAE
Aloe affinis 107
Aloe albidia 95, 124
Aloe arborescens 34
Aloe arenicola 107
Aloe argenteicauda 65
Aloe aristata 27
Aloe asperifolia 76
Aloe ballii 54, 161
Aloe bicomitum 149
Aloe bowiea 95
Aloe brevifolia 95
Aloe broomii 25
Aloe buchananii 34
Aloe buettneri 65
Aloe buhrii 95
Aloe bulbicaulis 34
Aloe cameroni 34
Aloe canellii 34
Aloe chabaudii 34
Aloe chlorantha 95
Aloe chortolirioides 124, 130
Aloe claviflora 76
Aloe collina 161
Aloe comosa 95
Aloe cooperi 118, 127, 130
Aloe coralina 65
Aloe cryptopoda 34
Aloe dabenorisana 95
Aloe dewetii 124
Aloe dewinteri 65
Aloe dichotoma 76
Aloe dinteri 65
Aloe distans 95
Aloe dominiella 130
Aloe duckeri 39
Aloe eklonis 28, 124
Aloe enotata 149
Aloe erinacea 65
Aloe esculenta 76
Aloe excelsa 34, 140
Aloe falcata 107
Aloe ferox 27

Aloe fouriei 95
Aloe gariepensis 76
Aloe gerstneri 95
Aloe graciliflora 130
Aloe gracilis 118
Aloe greatheadii 34, 130
Aloe haemanthifolia 107
Aloe hardy 95
Aloe hazeliana 56, 161
Aloe hererensis 76
Aloe howmanii 56, 161
Aloe inconspicua 95
Aloe integra 130
Aloe inyangensis 171
Aloe khamesiensis 95
Aloe kniphofioides 124
Aloe krapophila 107
Aloe kroussii 124
Aloe lateritia 76
Aloe littoralis 76
Aloe longistyla 95
Aloe luapulana 149
Aloe lutescens 161
Aloe mawii 34
Aloe melanacantha 87
Aloe meyeri 65, 95
Aloe micrantha 95
Aloe microstigma 65
Aloe milne-redheadii 149
Aloe minima 124
Aloe modesta 118
Aloe monotropa 95
Aloe murchii 56, 178
Aloe musapana 178
Aloe myricantha 34, 161
Aloe namibensis 65
Aloe nubigena 95
Aloe ortholophia 161
Aloe pachygaster 65
Aloe parviflora 118
Aloe pearsonii 65, 95
Aloe peglerae 95
Aloe petrophila 95
Aloe pictifolia 95
Aloe pillansii 65, 95
Aloe plowesii 56, 161
Aloe polyphylla 25
Aloe pratensis 25, 96
Aloe pretoriensis 161
Aloe prinstooi 96
Aloe pruinosa 96
Aloe ramosissima 65, 96
Aloe reitzii 96
Aloe reynoldsi 96
Aloe rhodesiana 161
Aloe rupestris 56, 127
Aloe saponario 161
Aloe saundersiae 96
Aloe simii 96
Aloe sladeniana 65
Aloe soutpansbergensis 96
Aloe spicata 161
Aloe striata 76, 96
Aloe suffulta 34, 56, 161
Aloe swynnertonii 34
Aloe touri 161
Aloe thompsoniae 96
Aloe thorncroftii 96
Aloe vanbaleenii 127
Aloe variegata 76
Aloe vesei 149
Aloe viridiflora 65
Aloe vogtsii 118
Aloe vossii 96
Aloe vryheidensis 107
Aloe wildii 56, 161
Aloe zebrina 39, 76
AMARANTHACEAE 49, 56, 74, 86, 140, 145, 149
AMARYLLIDACEAE 25, 64, 74, 86, 96, 107, 118, 124, 127, 130, 149, 161, 178
Amayllis paradisicola 96
Amblygonocarpus andongensis 79
Ammania elate 51
Ammocharis nerinoides 74
Amphiasma divaricatum 83
Amphiasma merenskyanum 83
Amphiasma redheadii 155
Amphibolia obscura 68

Amphibolia rupis-arcutae 81
 Amphibolia saginata 81
 Anacamperos albissima 83
 Anacamperos rhodesiaca 18
 Anacamperos rufescens 30
ANACARDIACEAE 28, 34, 39, 49, 54, 56,
 64, 74, 86, 124, 127, 130, 145, 149, 161, 171
 Anagallis oligantha 40
 Anagallis rhodesia 153
 Anagracum stella-africæ 41
 Anaxeton angustifolium 98
 Anaxeton brevipes 109
 Anaxeton ellipticum 109
 Anaxeton hirsutum 109
 Anaxeton virgatum 109
 Aneilema dregeanum 127
 Aneilema richardsiae 150
 Aneilema schlechteri 131
 Anginon streyi 71
 Angracopsis gassneri 153
 Angracopsis trifurca 166
 Angraecum chamaeanthus 112
 Angraecum chimanianense 166
 Angraecum geniculatum 153
 Angraecum stella-africæ 101, 167
 Anisodonteia gracilis 26
 Anisodonteia julii 29
 Anisopappus chinensis 172
Anisopappus dentatus 172
 Anisopappus pinnatifidus 76
 Anisopappus pseudopinnatifidus 65
 Anisotes bracteatus 171
ANNONACEAE 49, 54, 56, 74, 127, 130,
 140, 161, 171
 Anogramma leptophylla 42
 Ansellia africana 18, 71, 112
ANTHERICACEAE 39, 127, 130
 Antherothamnus pearsonii 83, 177
 Anthospermum ammannioides 52
 Anthospermum vallicola 52
 Anthoxanthum brevifolium 30
 Antiaris toxicaria 142
 Anticharis ebracteata 83
 Anticharis imbricata 83
 Anticharis inflata 83
 Antimima argentea 68
 Antimima aurasensis 68
 Antimima buchbergensis 68
 Antimima dolomitica 81
 Antimima eendornensis 68
 Antimima modesta 68
 Antimima perforata 81
 Antimima quartzitica 68
 Antiphonia fragrans 79
 Antiphonia pinnatisecta 76
 Antithrix flavicoma 109
 Antizoma angustifolia 81
 Anthrophyum mannianum 42
 Aphanocalyx trapnellii 141
APIACEAE 25, 34, 49, 64, 74, 86, 127,
 140, 162, 171
APOCYNACEAE 54, 56, 64, 74, 86, 97, 108,
 118, 124, 127, 140, 145, 162, 171.
 See also **ASCLEPIADACEAE**; **PERIPOLOACEAE**
 Apodilirion amiana 118
 Apodilirion bolusii 118
 Apodilirion cedarbergense 96
 Apodilirion lanceolatum 107
 Apodilirion macowanii 118
 Aponogeton azureus 65
 Aponogeton ranunculiflorus 25
 Aponogeton stuhlmannii 149
APONOGETONACEAE 25, 65, 149
 Aporrhiza nitida 176
 Aptenia geniculiflora 81
 Aptosimum albomarginatum 92
 Aptosimum angustifolium 92
 Aptosimum arenarium 83
 Aptosimum glandulosum 92
 Aptosimum suberosum 83
ARACEAE 162
ARALIACEAE 127, 130, 140
 Arctotis bolusii 109
 Arctotis dregei 98
 Arctotis fosteri 98
 Arctotis frutescens 65
 Arctotis leiocarpa 76
 Arctotis macrosperma 98
 Arctotis rogersii 20
 Arctotis serpens 86
 Arctotis sulcicarpa 109
ARECACEAE 56, 149, 162
 Aridaria brevicarpa 82
 Aridaria noctiflora 82

Aridaria serotina 82
 Aristida brainii 181
 Aristida hispidula 181
 Aristida monticola 147
 Aristida serrulata 181
 Aristida transvaalensis 129
 Aristida wildii 20
 Artabotrys monteiroae 171
 Arthraera leubnitziae 74
Arundinaria tessellata 133
ASCLEPIADACEAE 18, 20, 25, 27, 28, 39,
 124, 127, 130, 145, 149, 162, 171, 178
 Asclepias crassinervis 130
 Asclepias cultriformis 130
 Asclepias emmens 28, 124
 Asclepias xysmaloboides 28
 Asclepias ampullacea 150
 Asclepias majestosa 150
 Asclepias protea 150
 Asclepias pseudopeterei 150
 Asclepias pusilla 150
 Asclepias trigona 150
ASPHODELACEAE 65, 76, 87, 124, 127,
 131, 140, 149. See also **ALOACEAE**
ASPLENIACEAE 39, 41, 149, 162, 171, 179
 Asplenium chascanum 149
 Asplenium christii 162
 Asplenium gemmascens 179
 Asplenium mossambicense 162
 Asplenium parablaspophorum 162
 Asplenium pellucidum 162
 Asplenium seburgueense 171
 Asplenium smedii 39
 Asplenium torrei 39
 Asplenium trichomanes 179
 Asplenium uhlighii 41, 179
 Asplenium unilaterale 39, 162
 Aster laevigatus 98
 Aster milanjanus 34
 Aster nubimontis 98
 Aster pseudobakeranus 124
ASTERACEAE 20, 25, 28, 34, 39, 41, 49,
 54, 56, 65, 76, 87, 98, 109, 118, 124, 127,
 131, 140, 145, 149, 163, 172, 179
 Astridia citrina 69
 Astridia hallii 69
 Astridia longifolia 69
 Astridia speciosa 69
 Astridia velutina 69
 Asystasia schimperii 86
 Asystasia welwitschii 86
 Athanasia capitata 98
 Athanasia crithmifolia 109
 Athanasia grandiceps 109
 Athanasia hirsuta 109
 Athanasia inopinata 98
 Athanasia ocephala 109
 Athanasia quinqueidentata 98
 Athanasia rugulosa 98
 Athanasia scabra 109
 Athanasia setulifera 98
 Athanasia spatulata 98
 Athanasia villosa 100
 Athrixia fontinalis 172
 Atriplex amboensis 78

B

Babiana longicollis 68
 Babiana namaquensis 90
 Bachmannia woodii 125
 Baikiaia plurijuga 67, 141, 174
 Baissea wulfhorstii 74
Balanitaceae 77
 Balanites welwitschii 77
BALSAMINACEAE 35, 39, 49, 56, 145,
 149, 172
 Baphia macrocalyx 58
 Baphia speciosa 141
 Baptorhachis foliaceae 51
 Barleria aromatica 178
 Barleria lanceolata 73
 Barleria mackenziei 73
 Barleria macrostegia 73
 Barleria matopensis 19
 Barleria megalosiphon 86
 Barleria molensis 171
 Barleria oxyphylla 130
 Barleria prionites 86
 Barleria rigida 73
 Barleria senensis 73
 Barleria solitaria 73
 Bartholinia ethelae 71

Basananthe baumii 147, 154
 Basananthe holmesii 147
 Basananthe parvifolia 181
 Batopedina linearifolia 147
 Baynesia lophophora 64
 Begonia nyassensis 35
 Begonia pygmaea 149
 Begonia sonderana 127
BEGONIACEAE 35, 127, 149
 Beilschmidia gilbertii 153
 Bergia glutinosa 79
 Berkheya johnstoniana 34
 Berkheya schinzii 76
 Berlinia orientalis 58
 Bersama swynnertonii 176
 Bersama transvaalensis 133
 Bidens oligoflora 149
 Asclepias majestosa 150
 Biophytum nyikense 143
 Biophytum richardsiae 143
 Bivinia jaltbertii 165
BLECHNACEAE 39, 172
 Blechnum ivohibense 39, 172
 Blepharis bainesii 19
 Blepharis diversispina 73
 Blepharis drummondii 178
 Blepharis dunensis 49
 Blepharis furcata 73
 Blepharis gazensis 49
 Blepharis gigantea 73
 Blepharis grossa 73
 Blepharis integrifolia 73
 Blepharis leendertziae 73
 Blepharis macra 86
 Blepharis maderaspatensis 73
 Blepharis mitrata 73
 Blepharis obmitrata 73
 Blepharis pruinosa 73
 Blepharis swaziensis 49
 Blepharis tenuiramea 73
 Blepharis torrei 49
 Blighia unijugata 148, 176
 Bobgunnia madagascariensis 79
 Boerhavia deserticola 82
 Boerhavia repens 82
 Bolbitis gemmifera 174
 Bolboschoenus nobilis 78
 Bolusia amboensis 90
 Bolusiella maudiae 41, 112, 175
BOMBACACEAE 49
Bombax mossambicensis 49
 Bonatea densiflora 98
 Bonatea lamprophylla 101
 Bonatea saundersiae 101
 Bonatea speciosa 112, 180
 Bonatea steudneri 71
 Boophaea disticha 25, 74
BORAGINACEAE 28, 54, 77, 88, 140, 150
 Borassus aethiopicum 162
 Boscia angustifolia 77
 Boscia cauliflora 145
 Boscia foetida 19
 Boscia microphylla 77
 Boscia tomentosa 77
 Bothriocline milanjanensis 34
 Bothriocline morrumballae 56
 Bothriocline steetziana 56
 Bowia gariensis 68
 Bowia volubilis 125
 Brachilaria pungipes 147
 Brachiaria sp. 59
 Brachyachne simonii 154
 Brachycorythis conica 142
 Brachycorythis macowaniana 112
 Brachycorythis mixta 153
 Brachycorythis pilosa 146
 Brachystegia astleyi 151
 Brachystegia michelmoresii 151
 Brachystegia puberula 145
 Brachystelma alpinum 25
 Brachystelma australe 108
 Brachystelma blepharanthera 74
 Brachystelma caffrum 97
 Brachystelma campanulatum 97
 Brachystelma cathartense 109
 Brachystelma chlorozonum 130
 Brachystelma circinatum 74, 130
 Brachystelma coddii 124
 Brachystelma codonanthum 86
 Brachystelma comptum 118
 Brachystelma cupulatum 74
 Brachystelma delicatum 109
 Brachystelma dimorphum 97, 109
 Brachystelma dinteri 74

Brachystelma discoideum 97, 171
 Brachystelma dyeri 97
 Brachystelma frankiae 97
 Brachystelma furcatum 178
 Brachystelma gemmeum 109, 130
 Brachystelma gerrardii 130
 Brachystelma glenense 109
 Brachystelma gracillimum 118
 Brachystelma gymnopodium 74
 Brachystelma hirtellum 118, 178
Brachystelma hirtellum 109
 Brachystelma incanum 109
 Brachystelma inconspicuum 109
 Brachystelma kerzneri 97
 Brachystelma lancasteri 178
 Brachystelma longifolium 109
 Brachystelma meyerianum 97
 Brachystelma micranthum 118
 Brachystelma minimum 109
 Brachystelma minor 109
 Brachystelma moleventi 97
 Brachystelma montanum 97
 Brachystelma natalense 97
 Brachystelma nomense 97
 Brachystelma occidentale 98
 Brachystelma parvulum 109
 Brachystelma perditum 27, 109
 Brachystelma petraeum 109
 Brachystelma pilosum 109
 Brachystelma punctatum 178
 Brachystelma recurvatum 86
 Brachystelma richardsii 162
 Brachystelma schinzii 64
 Brachystelma schoenlandianum 118
 Brachystelma schultzei 64
 Brachystelma stenophyllum 124
 Brachystelma swazicum 74
 Brachystelma tabularium 118
 Brachystelma tenellum 109
 Brachystelma tenue 98
 Brachystelma vahmeijeri 98
 Brachystephanus africanus 161
Brachythrix brevipapposa 39
 Brachythrix malawiensis 39
 Brachythrix sonchioides 34
BRASSICACEAE 77, 88, 150
 Bridelia atrovirens 164
 Bridelia mollis 89
 Bridelia tenuifolia 89
 Brillantaisia pubescens 178
 Bromus firmior 30
 Brownanthus ciliatus 82
 Brownanthus namibensis 69
 Brownanthus pubescens 69
 Brownleea mulanjiensis 37
 Brownleea recurvata 29, 112
 Brunsvigia elandsmontana 96
 Brunsvigia gydybergensis 96
 Brunsvigia herrei 64, 96
 Brunsvigia litoralis 96
Brunsvigia minor 107
 Brunsvigia pulchra 107
 Brunsvigia radula 86, 96
 Brunsvigia striata 107
 Brunsvigia undulata 107
 Buchnera androsacea 182
 Buchnera arenicola 155
 Buchnera chisumpae 144
 Buchnera crassifolia 40, 155
 Buchnera cryptocephala 144
 Buchnera ebracteolata 144
 Buchnera granitica 169
 Buchnera laxiflora 148
 Buchnera namuliensis 59
 Buchnera nervosa 144
 Buchnera nitida 155
 Buchnera pulcherrima 155
 Buchnera pusilliflora 182
 Buchnera trilobata 148
 Buddlejia pulchella 172
BUOULEJACEAE 172
 Bulbine caput-medusae 65
 Bulbine francescae 65
 Bulbine inflata 127
 Bulbine namaensis 65
 Bulbine tetraphylla 87
 Bulbophyllum ballii 167
 Bulbostylis micromucronata 150
BURSERACEAE 77, 88, 163
 Burttdavya nyasica 38
 Burtia prunoides 140
 Bussea massaiensis 141
BUXACEAE 35
 Buxus nyasica 35

Cadaba aphylla 77
 Cadaba schroepelii 78
 Cadaba termitaria 66
 Caesalpinia merxmuellerana 67
 Caesalpinia pearsonii 79
 Caesalpinia rubra 79
Calanthe natalensis 133
Calanthe sylvatica 112, 133
Calicorema squarrosa 74
Calostephane marlothiana 76
Calurnia robinoides 25
CAMPANULACEAE 28, 66, 77, 88, 100, 111, 119, 140, 150
CANELACEAE 35, 49, 124, 163
Canscora kirkii 142
Canthium glaucum 92
Canthium ngonii 168
Canthium oligocarpum 176
Canthium racemulosum 59, 176
Canthium suberosum 134
CAPPARACEAE 19, 35, 49, 54, 56, 66, 77, 125, 127, 140, 145, 163
Capparis hereroensis 78
Capparis tomentosa 78
Caralluma kalaharica 18
Caralluma kalaharica 18
Caralluma peschii 64
Caralluma schweinfurthii 171
Caralluma ubambaensis 127
Cardiochilus williamsonii 41
Carex acocksii 100
Carex brassii 39
Carex killickii 25
Carex monstrosa 29
Carex robinsonii 150
Carissa haematacarpa 74
Carissa praetermissa 56
Carpha schlechteri 111
Carpolyza spiralis 108
CARYOPHYLLACEAE 78, 125, 163
Cassia afrodistula 165
Cassipourea fanshawei 143
Cassipourea obovata 52
Cassipourea swaziensis 134
Catophractes alexandri 77
CELASTRACEAE 39, 49, 131, 163, 172
Celosia chenopodiifolia 149
Celosia nervosa 56
Celosia pandurata 49
Celosia richardsiae 140
Celtis gomphophylla 126, 177
Celtis mildbraedii 126, 169
Cenchrus mitis 54
Cenia duckittiae 98
Centella obtriangularis 49, 171
Centrostigma occultans 167
Cephalaria decurrens 119
Cephalaria petiolata 128
Cephalaria pungens 128
Cephalophyllum compressum 69
Cephalophyllum confusum 69
Cephalophyllum ebracteatum 82
Cephalophyllum herrei 69
Ceraria fruticulosa 83
Ceraria longipedunculata 83
Ceraria namaquensis 83
Ceratandra venosa 112
Ceratopteris cornuta 155
Ceropegia ampliata 130
Ceropegia antennifera 98
Ceropegia barbata 118
Ceropegia bowkeri 118
Ceropegia cancellata 109
Ceropegia carnosa 130
Ceropegia cataphyllaris 149
Ceropegia cimicidora 98, 124
Ceropegia crassifolia 130
Ceropegia cynniflora 98
Ceropegia decidua 98, 130
Ceropegia dinteri 64
Ceropegia dubia 118
Ceropegia filiformis 64
Ceropegia fimbriata 109
Ceropegia floribunda 20, 86
Ceropegia fortuita 130
Ceropegia insignis 98
Ceropegia linearis 130
Ceropegia lugardiae 74
Ceropegia mafekingensis 64, 109
Ceropegia multiflora 74
Ceropegia nilotica 75, 130
Ceropegia occidentalis 86, 118

Ceropegia pachystelma 64, 130
Ceropegia paricyma 39, 64
Ceropegia plicata 130
Ceropegia purpurascens 75
Ceropegia racemosa 75, 130
Ceropegia radicans 98, 109
Ceropegia rendallii 130
Ceropegia rudatisii 118
Ceropegia sandersonii 130
Ceropegia scabriflora 109
Ceropegia stenantha 64
Ceropegia stenoloba 75
Ceropegia stentiae 109
Ceropegia tomentosa 118
Ceropegia turricula 109
Chamaecrista capensis 133
Chamaegigas intrepidus 71
Chasalia parvifolia 168
Chasealia pseudohydrya 167
Chasmatophyllum musculinum 69
Cheirostylis gymnochloides 112, 125, 175
CHENOPODIACEAE 49, 57, 66, 78, 88
Chenopodium amboanum 88
Chionanthus foveolatus 129
Chionanthus niloticus 153
Chionanthus richardsiae 142
Chlorophytum acutum 130
Chlorophytum haygarthii 127
Chlorophytum nyssae 39
Chlorophytum saundersiae 130
Chrysocoma esterhuyzeniae 98
Chrysocoma microphylla 87
Chrysophyllum viridifolium 169
Cincinnobotrys acaulis 153
Cissampelos hirta 54
Cissus bathyrrhakodes 52
Cissus fanshawi 148
Cissus petiolata 177
Cissus producta 177
Citropsis dawsoni 83
Citrullus ecirrhosus 78
Citrullus rehmi 78
Cleome bororensis 54
Cleome carnosus 78
Cleome densifolia 35
Cleome macrophylla 127, 145
Clerodendron incisum 169
Clerodendrum sansibarense 156
Cliffortia acocksii 102
Cliffortia aculeata 115
Cliffortia acutifolia 115
Cliffortia alata 115
Cliffortia arborea 115
Cliffortia burgensis 102
Cliffortia carinata 115
Cliffortia concinna 103
Cliffortia confertifolia 103
Cliffortia crenulata 120
Cliffortia curvifolia 103
Cliffortia cymbifolia 120
Cliffortia discolor 103
Cliffortia ericifolia 103
Cliffortia geniculata 103
Cliffortia graminea 115
Cliffortia hantamensis 115
Cliffortia hermaphroditica 103
Cliffortia hirta 103
Cliffortia intermedia 120
Cliffortia lanata 103
Cliffortia longifolia 115
Cliffortia marginata 103
Cliffortia monophylla 103
Cliffortia montana 115
Cliffortia multifloris 120
Cliffortia nivenioides 115
Cliffortia reticulata 115
Cliffortia strigosa 115
Cliffortia subdura 103
Clivia caulescens 107, 130
Clivia gardenii 107
Clivia miniata 107, 127, 130
Clivia nobilis 107, 130
CLUSIACEAE 145
Clusia brassii 35
Clusia conferta 35
Clusia monticola 164
Clusia punctata 173
Clusia sessilifolia 164
Clusia stelleroides 164
Clusia whytei 141
Cnestis polyphylla 163
Coccinia fernandesiana 57
Coccinia subglabra 50
Cochlidium serrulatum 174

Codon royeri 81
Codon schenckii 81
Coffea ligustroides 168
Coffea mufindiensis 38, 42, 143, 168
Coffea zanguebariae 59, 168
Coffea sp. 42
Cola clavata 55
Cola discoglypsemnophylla 60
Cola mossambicensis 38, 52
COLCHICACEAE 78, 131, 140
Coleonema virgatum 105
Colpodium drakensbergense 30
Colpadiadum hedbergii 30
COMBRETACEAE 39, 50, 54, 78, 88, 140, 150, 163
Combretum albopunctatum 78
Combretum caudatisepalum 50
Combretum collinum 88
Combretum coriifolium 163
Combretum elaeagnoides 78
Combretum lasiocarpum 54
Combretum mweroense 140
Combretum oxystachyum 88
Combretum padoides 150
Combretum psidioides 78
Combretum schumannii 88
Combretum stocksii 50
Combretum umbricola 163
Combretum wattii 78
Commelina grandis 150
Commelina pycnospatha 150
COMMELINACEAE 50, 127, 131, 150, 163
Commicarpus decipiens 91
Commiphora africana 77
Commiphora anacardiifolia 77
Commiphora capensis 77
Commiphora cervifolia 77
Commiphora crenato-serrata 77
Commiphora dinteri 77
Commiphora discolor 77
Commiphora edulis 77
Commiphora giesii 77
Commiphora glandulosa 77
Commiphora glaucescens 77
Commiphora gracilifronsia 77
Commiphora krauselliana 77
Commiphora mollis 77
Commiphora mossambicensis 88
Commiphora multijuga 77
Commiphora namaensis 77
Commiphora neglecta 163
Commiphora oblanceolata 77
Commiphora pyracanthoides 77
Commiphora saxicola 77
Commiphora tenuipetiolata 77
Commiphora viminea 88
Commiphora virgata 77
Commiphora wildii 77
Coniogramme africana 40
CONNARACEAE 50, 78, 140, 163
Conophytum achabense 95
Conophytum acutum 95
Conophytum angelicae 69
Conophytum amianum 107
Conophytum auriflorum 95, 107
Conophytum bicarinatum 107
Conophytum blandum 107
Conophytum burgeri 95
Conophytum carpanum 107
Conophytum concavum 107
Conophytum ernstii 107
Conophytum friedrichae 69
Conophytum frutescens 107
Conophytum gratum 69
Conophytum halenbergense 69
Conophytum herreanthus 95
Conophytum khamiesbergense 107
Conophytum klinghardtense 69
Conophytum lithopsoides 107, 118
Conophytum loeschianum 69, 107
Conophytum marginatum 91
Conophytum maughanii 69
Conophytum pageae 69
Conophytum phoeniceum 95
Conophytum praeseptum 107
Conophytum quassitum 69
Conophytum regale 107
Conophytum ricardianum 69, 91
Conophytum roodiae 95
Conophytum rugosum 107
Conophytum rugosum 95
Conophytum saxetanum 69
Conophytum schlechteri 95
Conophytum semivestitum 95

Conophytum smorenskaduense 95
Conophytum swanepoelianum 107
Conophytum taylorianum 69
Conophytum uviforme 95
Conophytum vanheerdei 95
Conophytum velutinum 107
Conophytum verrucosum 107
Conophytum wetsteinii 91
Conostomium gazense 52
CONVOLVULACEAE 50, 57, 78, 111, 119, 141, 145, 150, 163, 172
Convolvulus ocellatus 172
Corallolacarpus schinzii 78
Corallolacarpus triangularis 179
Corbichonia rubriviolacea 91
Corchorus merxmulleri 84
Corchorus saxatilis 148
Cordia grandicalyx 77
Cordia monoica 77
Cordia pilosissima 88
Cordia sinensis 77
Cordia stuhlmannii 54
Cordyla africana 128, 145
Coronopus zambiensis 150
Corbichonia drymaroides 145
Corrigiola paniculata 152
Corycium alticola 29
Corycium bifidum 120
Corycium deflexum 112
Corycium excisum 112
Corycium flanaganii 112
Corycium ingeanum 112
Corycium microglossum 101
Corycium orobanchioides 113
Corycium tricuspidatum 113
Corycium vestitum 113
Corymborkis corymbis 113, 175
COSTACEAE 163
Costularia natalensis 111, 131
Costus afer 163
Cotula duckittiae 98
Cotula loganii 98
Cotula myriophyllioides 98
Cotula paradoxa 98
Cotula pedunculata 98
Cotyledon orbiculata 128
Craspedorhachis digitata 181
Crassocephalum corleum 76
Crasulla acinaciformis 128
Crasulla alba 131
Crasulla atropurpurea 66
Crasulla auresbergensis 66
Crasulla ausensis 66, 88
Crasulla brevifolia 78
Crasulla campestris 66
Crasulla capitella 66
Crasulla columnaris 88
Crasulla compacta 131
Crasulla cooperi 179
Crasulla corallina 66, 88
Crasulla cotyledonis 66
Crasulla deceptor 88
Crasulla deltoidea 88
Crasulla dependens 88
Crasulla elegans 66, 78
Crasulla exilis 88
Crasulla expansa 50, 66
Crasulla fragilis 163
Crasulla fusca 78
Crasulla garibina 66
Crasulla globularioides 35
Crasulla greenwayi 134
Crasulla grisea 88
Crasulla lanceolata 78
Crasulla lanuginosa 28
Crasulla leachii 50
Crasulla luedertzi 66
Crasulla macowaniana 78
Crasulla maputensis 50
Crasulla mesembrianthemopsis 88
Crasulla morumbalensis 50
Crasulla muscosa 78
Crasulla namaquensis 66, 88
Crasulla nemorosa 66
Crasulla nodulosa 179
Crasulla numaisensis 66
Crasulla oblanceolata 66
Crasulla orbicularis 128
Crasulla pallens 88
Crasulla plegmatoides 66
Crasulla pseudoemiphaerica 66
Crasulla gothambensis 25
Crasulla rhodesica 78
Crasulla rudolfii 88

Crassula rupestris 66
Crassula sarcocaulis 35
Crassula setulosa 179
Crassula swaziensis 57
Crassula thunbergiana 66
Crassula vaginata 125
CRASSULACEAE 25, 28, 35, 50, 54, 57, 66,
 78, 88, 125, 128, 131, 163, 173, 179
Craterostigma monroi 182
Craterostigma plantagineum 83, 155
Crepidodhron bifolius 148
Crepidodhron involucreatus 144
Crepidodhron tenuifolius 144
Crinum acaule 107
Crinum baumii 86
Crinum campanulatum 107
Crinum carolo-schmidtii 86
Crinum delagoense 127
Crinum euschrophyllum 86
Crinum lineare 96
Crinum paludosum 64
Crinum parvibulosum 86
Crinum rautanenianum 86
Crinum subcernuum 86, 149
Crinum variabile 107
Crinum zeylanicum 86
Cromidion pusillum 72
Crossandra fruticulosa 56
Crossandra pingulor 56
Crossandra pyrophila 56
Crotalaria aurea 90
Crotalaria criniramea 141
Crotalaria kurtii 90
Crotalaria laburnifolia 79
Crotalaria nudiflora 152
Crotalaria phyllicoides 174
Crotalaria pilosiflora 36
Crotalaria polytricha 152
Crotalaria simona 141
Crotalaria trinervia 141
Crotalaria tristis 152
Crotalaria umbellifera 145
Crotalaria vanmeelii 152
Croton aceroides 50
Croton gossweileri 151
Croton inhambanensis 50
Croton kilwa 57
Croton leuconurus 50, 164
Croton longipedicellatus 145
Croton madandensis 128, 179
Croton megalobotrys 39
Croton polytrichus 145
Croton pseudopulchellus 89
Croton scheffleri 141
Croton steenkampianus 132
Cryptolepis delagoensis 98
Cryptosepalum exfoliatum 152
Cucumella clavipetiolata 67
Cucumis humifructus 89, 100, 141, 179
CUCURBITACEAE 50, 57, 67, 78, 89,
 100, 111, 141, 150, 163, 179
Cullen biflora 79
CUPRESSACEAE 35, 164, 173
Curculigo multiflora 142
Curculigo pilosa 146
Cuscuta kilimanjari 111
Cussonia nicholsonii 127
Cussonia zuluensis 130
Cuviera schliebenii 59
Cuviera tomentosa 59
Cyamopsis serrata 79
Cyanella amboensis 84
Cyathea capensis 128, 173
Cyathea dregei 25, 173
Cyathea manniana 173
Cyathea mossambicensis 35, 164
Cyathea thomsonii 164
Cyathea sp. 164
CYATHEACEAE 25, 35, 128, 164, 173
Cyathistes longifolia 86
CYCADACEAE 57
Cycas thouarsii 57
Cyclantheropsis parviflora 163
Cynanchum gerrardii 86
Cynanchum meyeri 28, 75
Cynanchum orangeanum 75
Cynanchum schistoglossum 86
Cynoglossum alticola 28
Cynorkis anacamptoides 37
Cynorkis anisobola 175
Cynorkis brevilcar 37
Cynorkis buchananii 40
Cynorkis compacta 113
Cynorkis symoensii 41

CYPERACEAE 19, 20, 25, 29, 35, 39,
 41, 67, 78, 100, 111, 119, 131, 150
Cyperus altochrysocephalus 150
Cyperus kasamensis 150
Cyperus mwinilungensis 150
Cyperus natalensis 111
Cyperus robinsonii 150
Cyperus zambesensis 150
Cyphia alba 180
Cyphia bolusii 119, 129
Cyphia brummittii 36
Cyphia comptonii 119
Cyphia corylifolia 119
Cyphia decora 36
Cyphia dentariifolia 119
Cyphia longiflora 120
Cyphia longilobata 120
Cyphia oligotricha 112
Cyphia ranunculifolia 120
Cyphia salteri 101
Cyphia stephensis 101
Cyphia tortilis 120
Cyphostemma abercornense 144
Cyphostemma amplexum 60
Cyphostemma bainesii 72
Cyphostemma barbosae 52
Cyphostemma borensis 92
Cyphostemma cirrhosum 84
Cyphostemma congestum 84
Cyphostemma currorii 84
Cyphostemma granticum 182
Cyphostemma hereroense 84
Cyphostemma juttae 72
Cyphostemma masukuense 169
Cyphostemma nanellum 156
Cyphostemma omburensis 84
Cyphostemma puberulum 92
Cyphostemma richardsiae 148
Cyphostemma rotundistipulatum 144
Cyphostemma ruacanense 84
Cyphostemma sandersonii 84
Cyphostemma saxiculatum 148
Cyphostemma tenuissimum 156
Cyphostemma trachyphyllum 52
Cyphostemma uter 84
Cyrtanthus bicolor 107, 127
Cyrtanthus brachyscyphus 107
Cyrtanthus carneus 96
Cyrtanthus collinus 108
Cyrtanthus epiphyticus 108
Cyrtanthus flammousus 96
Cyrtanthus guthrieae 96
Cyrtanthus helictus 108
Cyrtanthus herrei 86, 108
Cyrtanthus leptosiphon 96
Cyrtanthus leucanthus 108
Cyrtanthus loddigesianus 108
Cyrtanthus nutans 124
Cyrtanthus odoros 96
Cyrtanthus rectiflorus 107
Cyrtanthus smithiae 108
Cyrtanthus spiralis 96
Cyrtanthus staadensis 108
Cyrtanthus suaveolens 96
Cyrtanthus wellandii 96
Cyrtorchis glaucifolia 59
Cystostemon hispidissimus 140
Cystostemon loveridgei 150
Cystostemon mwinilungensis 150

D

Dactyliandra welwitschii 78
Dais cotinifolia 30
Dalbergia acutifoliolata 152
Dalbergia martinii 90
Dalbergia melanoxylon 36, 141, 174
Dalbergia nitidula 90
Daniellia alsteenniana 141
Danthoniopsis chimanimaniensis 51, 176
Decorsea dinteri 67
Deinbollia borbonica 52
Deinbollia fanshawei 148
Deinbollia nyasica 38
Deinbollia xanthocarpa 176
Delosperma ashtonii 29
Delosperma clavipes 28
Delosperma nubigenum 29
Delosperma steylerae 166
Desmodium fulvescens 152
Dialium angolense 145
Dianella ensifolia 168
Dianthus chimanimaniensis 163

Dianthus mooiensis 125
Dianthus namaensis 78
Diaphanthera fragrantissima 167
Diaphanthera kamerunensis 167
Diaphanthera millarii 101
Dichaetanthera erici-rosenii 146
Dichaetanthera rhodesiensis 153
DICHAETALACEAE 50, 54, 57, 151, 164
Dichapetalum barbosae 54
Dichapetalum deflexum 57
Dichapetalum edule 57
Dichapetalum macrocarpum 57
Dichapetalum madagascariense 164
Dichapetalum mendoncae 50
Dichapetalum whitei 151
Dichapetalum zambesianum 50
Dichrostachys cinerea 79
Diclis tenuissima 71
Dicoma anomala 25
Dicoma capensis 87
Dicoma cuneneensis 87
Dicoma dinteri 87
Dicoma nicoilifera 172
Dicoma sessiliflora 87
Didelta carnosae 76
Didelta spinosa 76
Didymoplexis africana 180
Didymoplexis verrucosa 101
Dierama adelphicum 132
Dierama elatum 125
Dierama insigne 132
Dierama jucundum 29
Dierama longistylum 152
Dierama medium 132
Dierama mobile 128
Dierama mossii 132
Dietses flavida 128
Digitaria appropinquata 51
Digitaria bidactyla 147
Digitaria calcarata 154
Digitaria fuscipilosa 51
Digitaria megasthenes 51
Digitaria minoriflora 154
Digitaria procurrens 154
Digitaria sacculata 154
Digitaria tenuifolia 147
Digitaria trinervis 40
Diheteropogon microterus 154
Dimorphotheca walliana 98
Dintera pterocaulis 71
Dioscorea asteriscus 89
Dioscorea cochleari-apiculatus 89
Dioscorea dregeana 89
Dioscorea elephantipes 89
Dioscorea hemicypta 89
Dioscorea hirtiflora 89
Dioscorea quartiniana 89
DIOSCOREACEAE 89
Dioscoreophyllum cumminsii 166
Diosma arenicola 116
Diosma aristata 105
Diosma aspalathoides 120
Diosma awilana 116
Diosma demissa 116
Diosma dichotoma 120
Diosma fallax 105
Diosma guthriei 120
Diosma haelkraalensis 105
Diosma parvula 105
Diosma passernoides 105
Diosma strumosa 105
Diosma tenella 116
Diosma thyrsophora 105
Diospyros acockii 78
Diospyros anitae 50
Diospyros batocana 89
Diospyros chamaethamnus 79
Diospyros galpinii 128
Diospyros hoyleana 164
Diospyros inhacaensis 57
Diospyros mweroensis 151
Diospyros virgata 79
Diospyros sp. 57
DIPSACACEAE 119, 128
Disa amoena 101
Disa arida 101
Disa aurata 113
Disa barbata 101
Disa basutorum 29, 113
Disa begleyi 113
Disa bodkinii 113
Disa brachyceras 113
Disa brevipetala 101
Disa caffra 113, 153

Disa cardinalis 113
Disa cedarbergensis 101
Disa cephalotes 30, 113
Disa cernua 113
Disa clavicornis 101
Disa cochlearis 101
Disa cryptantha 153
Disa dichroa 146
Disa draconis 101
Disa ecalcarata 101
Disa extinctoria 113, 129
Disa forcipata 101
Disa forficaria 113
Disa fragrans 41
Disa galpinii 120
Disa hallackii 101
Disa intermedia 125
Disa introrsa 101
Disa longifolia 113
Disa lugens 101, 113
Disa macrostachya 101
Disa maculomarronina 102
Disa marlothii 113
Disa micropetala 113
Disa minor 113
Disa montana 113
Disa multifida 113
Disa neglecta 102
Disa nervosa 113
Disa newdigateae 102
Disa nubigena 102
Disa nyikensis 42, 142
Disa obtusa 113
Disa ocellata 113
Disa oreophila 30, 113
Disa ovalifolia 113
Disa physodes 102
Disa pillansii 113
Disa procera 102
Disa pulchra 113
Disa pygmaea 113, 120
Disa rhodantha 113, 175
Disa roeperocharoides 142
Disa sabulosa 102
Disa salteri 113
Disa sanguinea 120
Disa sankeyi 113
Disa schlechteriana 102
Disa scullyi 102
Disa spathulata 102, 113
Disa stachyoides 113, 129
Disa subtenuicornis 102
Disa tenella 102
Disa tenuicornis 113
Disa tenuis 113
Disa thodei 113
Disa tripetaloides 30, 113
Disa tysonii 113
Disa ukingensis 142
Disa venusta 113
Disa verdickii 153
Disa welwitschii 113, 146
Disa woodii 113
Disa zuluensis 113
Disperis aphylla 142
Disperis bifida 142
Disperis bodkinii 113
Disperis bolusiana 114
Disperis breviloaba 42, 153
Disperis concinna 114
Disperis cooperi 114
Disperis johnstonii 114
Disperis katangensis 154
Disperis mozambicensis 59
Disperis purpurata 102
Disperis stenoplectron 114
Disperis tysonii 114
Disperis virginalis 102
Disperis wealei 114
Disperis woodii 114
Dissotis angustifolia 51
Dissotis caloneura 153
Dissotis debilis 153
Dissotis glandulosa 153
Dissotis johnstoniana 40, 41
Dissotis lanata 36
Dissotis pulchra 51, 175
Dissotis simonis-jamesii 146
Distephanus angolensis 87
Distephanus divaricatus 87
Dolichandrone alba 49
Dolichos filifolius 152
Dolichos magnificus 152
Dombeya brachystemma 155

Ombeya lastii 52
 Ombeya leachii 52
 Ombeya rotundifolia 72, 84
Dorio obrotanifolia 110
Dorio linearifolia 118
 Oorstenia schleibenni 36
 Oorstenia zambesiaca 51
 Oovyalis spinosissima 36
ORACAENACEAE 78
Oracophilus dealbatus 91
Oracophilus delaetianus 91
Oracophilus montis-draconis 69
Oregeochloa pumila 91
Oriniopsis maculata 128
Oriniopsis maxima 132
Oroogmansia pteropus 141
Orosanthemum nordenstamii 91
ORYPTERIOACEAE 29, 132
Orypetes mossambicensis 128
Duosperma cuprinum 149
Duosperma fanshawei 149
Duosperma fimbriatum 149
Ouvalia caespitosa 86
Ouvalia maculata 75
Ouvalia polita 75, 178
Ouvernoia acotiflora 49, 124
Oyschoriste capricornis 178
Oyschoriste pilifera 178

E

EBENACEAE 50, 57, 78, 89, 128, 132, 151, 164
Eberlanzia clausa 82
Eberlanzia cyathiformis 91
Eberlanzia ebracteata 91
Eberlanzia schneideriana 69
Eberlanzia sedoides 82
Ecboium hastatum 56
Eccoptocarpa obconiciventrifera 147
Ecklonia solitona 100
Ectadium latifolium 75
Ectadium rotundifolium 75
Ectadium virgatum 75, 98
Eggingia clavata 42
Ehretia rigida 28
Ehrharta erecta 129, 133
Ehrharta longigluma 26
Elaeodendron fruticosum 49
Elaphoglossum decenii 41, 175
Elaphoglossum marojejense 175
Elaphoglossum mildbraedii 40
ELATINACEAE 79
Eleocharis cubangensis 20
Elephantorrhiza elephantina 29
Elephantorrhiza goetzei 90
Elephantorrhiza rangei 67
Elephantorrhiza schinziana 90
Embelia upembensis 142
Empodium namaquensis 112
Empodium occidentale 112
Encephalartos aplanatus 52, 126
Encephalartos chimanimaniensis 52, 170
Encephalartos concinnus 170
Encephalartos ferox 55
Encephalartos gratus 38, 55
Encephalartos heenanii 126
Encephalartos laevis 126
Encephalartos lebomboensis 52, 126
Encephalartos manikensis 55, 170
Encephalartos munchii 52
Encephalartos ngoyanus 53, 126
Encephalartos paucidentatus 126
Encephalartos pterogonus 53
Encephalartos relictus 126
Encephalartos senticosus 53, 126
Encephalartos turneri 55
Encephalartos umbeluziensis 53, 126
Encephalartos sp. 38
Englerina schlechteri 51
Erythrodaphne pilosa 116
Enneapogon sp. 59
Entada arenaria 79
Entada bacillaris 152
Entada dolichorachis 152
Entada mossambicensis 51
Entada schlechteri 51
Entandrophragma caudatum 90
Entandrophragma delevoyi 153
Entandrophragma spicatum 90
Eragrostis anacantha 147
Eragrostis anacanthoides 147
Eragrostis arenicola 83

Eragrostis astreptoclada 154
Eragrostis barbinodis 133
Eragrostis comptonii 129
Eragrostis dentifera 147
Eragrostis desolata 176
Eragrostis divanica 147
Eragrostis fastigiata 40
Eragrostis fimbriata 147
Eragrostis glioschra 181
Eragrostis habrantha 91
Eragrostis lepidobasis 147
Eragrostis mariae 147
Eragrostis milnei 147
Eragrostis oligostachya 147
Eragrostis patens 83
Eragrostis punctiglandulosa 143
Eragrostis sclerantha 91
Eragrostis sericata 59
Eragrostis spicigera 147
Eragrostis sylvia 37
Eragrostis walteri 83
Eremothamnus marlothianus 65
Erica austrorossiana 35
Erica oustoverna 132
Erica cerinthoides 128
Erica lanceolifera 173
Erica milaniana 39
Erica nyassana 35
Erica oatesii 128
Erica pleiotricha 50, 173
Erica revoluta 132
Erica simii 179
Erica swaziensis 125
Erica wildii 50, 173
Erica woodii 173
ERICACEAE
 35, 39, 50, 125, 128, 132, 173, 179
ERIOCAULACEAE 57, 173, 179
Eriocaulon infaustum 57
Eriocaulon matopense 179
Eriocaulon wildii 179
Eriocaulon ambiguus 76
Eriocaulon dinteri 76
Eriocaulon giessii 76
Eriocaulon kingesii 76
Eriocaulon klinghardtensis 65
Eriocaulon pauperum 76
Eriocaulon pinnatus 76
Eriocaulon scariosus 76
Eriocaulon tenuipes 109
Eriochloa rovumensis 55
Eriocoelum lawtonii 148
Eriosema ellipticifolium 129
Eriosema harmsiana 67
Eriosema transvaalense 129
ERIOSPERMACEAE 20, 67, 79, 89, 173, 179
Eriospermum bakerianum 79
Eriospermum buchbergense 67
Eriospermum ceciliii 179
Eriospermum citrinum 67
Eriospermum flexum 67
Eriospermum graniticolum 89
Eriospermum halenbergenae 67
Eriospermum lavranosii 67
Eriospermum linearifolium 20
Eriospermum mackenziei 79
Eriospermum mackenziei 173
Eriospermum namaquanum 89
Eriospermum parvifolium 89
Eriospermum phippii 173
Eriospermum rautanenii 79
Eriospermum roseum 79
Eriospermum seineri 20
Eriospermum volkmanniae 89
Erlangea remifolia 20
Erythrina decora 80
Erythrocephalum albiflorum 140
Erythrocephalum dictyophlebium 149
Erythrococca trichogyne 39
Erythrophloeum africanum 80
Erythrophysa alata 92
Erythrophysa transvaalensis 18, 169
ERYTHROXYLACEAE 57, 89
Erythroxylum zambesiaca 89
Euchaetis avisyilvana 105
Euchaetis diosmoides 105
Euchaetis esterhuysenae 116
Euchaetis intonsa 105
Euchaetis laevigata 116
Euchaetis linearis 116
Euchaetis longicornis 105
Euchaetis meridionalis 116
Euchaetis pungens 116
Euchaetis schlechteri 116

Euclea asperima 79
Euclea undulata 132
Eucumis autumnalis 25
Eugenia sp. 58
Eulophia angolensis 18, 180
Eulophia ousteroocidentalis 133
Eulophia biloba 59
Eulophia bisaccata 59
Eulophia chlorantha 125
Eulophia coddii 102
Eulophia coelogglossa 180
Eulophia cooperi 114
Eulophia flavopurpurea 180
Eulophia fredericii 91
Eulophia hereroensis 71, 167
Eulophia holubii 114, 154
Eulophia holubii 180
Eulophia inyangensis 181
Eulophia kyimbilae 181
Eulophia latilabris 18
Eulophia leachii 71, 102
Eulophia litoralis 114
Eulophia livingstoniana 71
Eulophia macrantha 175
Eulophia meleagris 114
Eulophia milnei 181
Eulophia monticola 42
Eulophia monticola 181
Eulophia petersii 59
Eulophia platypetala 114
Eulophia richardsiae 154
Eulophia saxicola 154
Eulophia schweinfurthii 91
Eulophia speciosa 82, 114, 133
Eulophia tabularis 114
Eulophia tanganyikensis 181
Eulophia walleri 71, 167
Eulophia zeyheriana 114
Eulophia sp. 167
Eumorphia swaziensis 127
Euphorbia acervata 164
Euphorbia amphiphylla 41
Euphorbia angrae 67
Euphorbia avasmontana 79
Euphorbia baliola 89
Euphorbia benthamii 89
Euphorbia berotica 67
Euphorbia brachiata 89
Euphorbia burmannii 89
Euphorbia caperionoides 79
Euphorbia chamaesycoideis 79
Euphorbia chersina 79
Euphorbia cibdela 67
Euphorbia clavigera 57, 128
Euphorbia confinis 164
Euphorbia congestiflora 89
Euphorbia cooperi 151, 173
Euphorbia crotonoides 79
Euphorbia damarana 79
Euphorbia debilis 141
Euphorbia decidua 151, 164
Euphorbia decussata 79
Euphorbia dissitifolia 164
Euphorbia distinctissima 141
Euphorbia dregeana 79
Euphorbia eduardoi 67
Euphorbia ephedroides 79, 89
Euphorbia espinosa 89
Euphorbia fanshawei 141
Euphorbia forskalii 79
Euphorbia fortissima 151, 164
Euphorbia friedrichiae 67
Euphorbia fusca 89
Euphorbia gariepina 79
Euphorbia giessii 79
Euphorbia glanduligera 79
Euphorbia gossypina 173
Euphorbia grandicornis 128
Euphorbia granitica 57
Euphorbia gregaria 79
Euphorbia griseola 151, 173
Euphorbia guerichiana 79, 173
Euphorbia gummifera 79
Euphorbia halipedicola 164
Euphorbia hamata 79
Euphorbia herrei 67
Euphorbia hottentota 89
Euphorbia ingens 89
Euphorbia insarmentosa 79
Euphorbia inundatica 151
Euphorbia isacantha 41
Euphorbia jubata 151
Euphorbia juttae 79
Euphorbia kaokoensis 67

Euphorbia karroensis 89
Euphorbia keithii 125
Euphorbia knobellii 132
Euphorbia lavrani 67
Euphorbia leisteri 67
Euphorbia lignosa 79
Euphorbia lividiflora 35, 164
Euphorbia luapulana 151
Euphorbia maleolensis 164
Euphorbia malevola 173
Euphorbia matabeleensis 89
Euphorbia melanohydrata 67
Euphorbia memorialis 164
Euphorbia milaniana 35
Euphorbia monteiri 67, 79, 179
Euphorbia mwiniungensis 151
Euphorbia namibensis 67
Euphorbia namuskluftensis 67
Euphorbia otjipembana 67
Euphorbia papillosicapsa 151
Euphorbia perplexa 141, 151
Euphorbia persistentifolia 173
Euphorbia phylloclada 79
Euphorbia platyrrhiza 151
Euphorbia plenispina 50
Euphorbia pseudoduseimata 89
Euphorbia richardsiae 41
Euphorbia rowlandii 179
Euphorbia rudis 79
Euphorbia rugosiflora 164
Euphorbia schinzii 173
Euphorbia sereti 151
Euphorbia silicicola 89
Euphorbia spartaria 89
Euphorbia speciosa 141
Euphorbia stapelioides 89
Euphorbia subsals 67
Euphorbia transvaalensis 79
Euphorbia trichadenia 164
Euphorbia venenata 89
Euphorbia venterii 18
Euphorbia verruculosa 67
Euphorbia virosa 79
Euphorbia volkmanniae 90
Euphorbia whellanii 151
Euphorbia whyteana 39
Euphorbia wildii 173
Euphorbia williamsonii 151
EUPHORBACEAE 18, 19, 35, 39, 41, 50, 54, 57, 67, 79, 89, 125, 128, 132, 141, 145, 151, 164, 173, 179
Eurelandra sp. 57
Euryops brevifolius 109
Euryops brevipes 98
Euryops ciliatus 98
Euryops decipiens 98
Euryops dentatus 98
Euryops evansii 28
Euryops gracilipes 98
Euryops hypnoides 98
Euryops indecorus 98
Euryops inops 28
Euryops integrifolius 99
Euryops marlothii 109
Euryops mirus 99
Euryops mucosus 66
Euryops murii 99
Euryops pectinatus 99
Euryops pleiodontus 99
Euryops polytrichoides 109
Euryops rosulatus 99
Euryops subcarneus 99
Euryops ursinoides 99
Euryops virgatus 99
Euryops walterorum 66
Euryops zeyheri 99
Evotella rubiginosa 114
Exacum oldenlandioides 146
Excoecaria bussei 90
Exomis microphylla 88

F

FABACEAE 19, 20, 36, 39, 41, 67, 79, 90, 141, 145, 151.
 See also **LEGUMINOSAE**
Fadogia chlorantha 143
Fadogia luangwae 155
Fadogia schmitzii 143
Fadogia tomentosa 147, 155
Fadogia triphylla 148
Fadogia varifolia 143
Fagara schlechteri 52

Fagonia isotricha 84
 Faidherbia albidia 80
 Faraa allata 152
 Faraa corniculata 142
 Faraa involuocrata 60
 Faraa minutiflora 152
 Faurea macnaughtonii 134
 Faurea racemosa 42
 Faurea saligna 182
 Felicia alba 66
 Felicia annectens 99
 Felicia canaliculata 109
 Felicia deserti 99
 Felicia diffusa 99
 Felicia ebracteata 99
 Felicia elongata 99
 Felicia esterhuysenae 99
 Felicia fruticosa 99
 Felicia gumillae 66
 Felicia nigrescens 99
 Felicia nordenstamii 99
 Felicia smaragdina 76
 Felicia tsitsikamiae 99
 Felicia wrightii 99
 Fenestraria rhopalophylla 69
 Feretia aeruginescens 92
 Fernandoa magnifica 163
 Ferraria glutinosa 81
 Ferraria schaeferi 68
 Festuca dracomontana 30
 Festuca kilickii 30
 Ficinia gydomontana 111
 Ficinia micrantha 119
 Ficinia pygmaea 111
 Ficinia quinquangularis 112
 Ficus ardisioides 153
 Ficus bubu 129, 166
 Ficus burtt-davyi 133
 Ficus exasperata 175
 Ficus fischeri 82, 166
 Ficus glumosa 82
 Ficus ingens 91
 Ficus modesto 36
 Ficus muelleriana 58
 Ficus ottonifolia 36, 146, 166
 Ficus polita 125
 Ficus pygmaea 82
 Ficus sansibarica 125
 Ficus scassellatii 41, 58, 166
 Ficus sycomorus 82
 Ficus thonningii 82
 Ficus usambarensis 142
 Ficus vallis-choudae 166
 Ficus verruculosa 91
 Filicium decipiens 176
 Flacourtia indica 80
 FLACOURTIACEAE
 36, 41, 50, 80, 128, 152, 165, 173
 Fockea multiflora 87
 Forsskaolea candida 84
 Forsskaolea hereroensis 84
 Forsskaolea viridis 84
 Frankenia pomonensis 80
 FRANKENIACEAE 80
 Friesodielsia obovata 74
 Frommia ceratophylloides 140
 Fuirena nyasensis 41

G

Galenia africana 74
 Galenia fallax 86
 Galenia papulosa 74
 Gardenia imperialis 168
 Gardenia posoquerioides 168
 Gardenia resiniflua 92
 Gardenia ternifolia 92
 Gardenia thunbergia 125
 Gasteria batesiana 127
 Gazania thermalis 66
 Geigeria acaulis 76
 Geigeria alata 76
 Geigeria schinzii 163
 Gentisea glandulosissima 153
 Gentisea pallida 153
 GENTIANACEAE 60, 132, 142, 146, 152
 Geophila sp. 155
 GERANIACEAE 29, 36, 80
 Geranium mlanjense 36
 Gerrardanthus tomentosus 100
 GESNERIACEAE
 36, 39, 50, 125, 128, 132, 146, 180
 Gethyllis barkerae 96

Gethyllis britteniana 118
 Gethyllis campanulato 108
 Gethyllis ciliaris 108
 Gethyllis fimbriatula 118
 Gethyllis lata 96
 Gethyllis latifolia 118
 Gethyllis multifolia 108
 Gethyllis pectinata 96
 Gladiolus bellus 36
 Gladiolus brachyphyllus 125
 Gladiolus dalenii 81
 Gladiolus ferrugineus 132
 Gladiolus hollandii 132
 Gladiolus magnificus 81
 Gladiolus orchidiflorus 81
 Gladiolus permeabilis 81
 Gladiolus saccatus 81
 Gladiolus serenensis 142
 Gladiolus vorius 132
 Gleichenia elongata 36
 GLEICHENIACEAE 36
 Gloriosa sessiliflora 140
 Glumicalyx lesuticus 27
 Glyphaea tomentosa 55
 Gnaphalium griquense 28, 99
 Gnaphalium nelsonii 118
 Gnidia chapmanii 42
 Gnidia leipoldtii 116
 Gnidia parviflora 116
 Gnidia scabrida 116
 Gnidia singularis 30, 120
 Gomphocarpus filiformis 75
 Gomphocarpus glaucophyllus 64
 Gomphocarpus rostratus 75
 Gomphocarpus tomentosus 75
 Gonioma kamassi 127
 Gossypium herbaceum 81
 GRAMMITIDACEAE 39, 174
 Grevea eggelingii 51
 Grewia conocarpa 60
 Grewia falcistipula 84
 Grewia hornbyi 60
 Grewia inaequaliteria 92
 Grewia timae 60
 Grewia monticola 92
 Grewia pachycalyx 92
 Grewia subspatulata 92
 Griellum cuneifolium 20
 Gutenbergia mwerensis 140
 Gutenbergia spermaceoides 140
 Gutenbergia trifolia 140
 Gutenbergia westii 54
 Gymnopentzia bifurcata 28
 Gymnospora matopensis 172
 Gymnospora gariepensis 78
 Gymnosporia linearis 78
 Gymnosporia szyszygłowiczii 78

H

Habenaria anaphysemia 181
 Habenaria argentea 146
 Habenaria armatissima 82, 181
 Habenaria bicolor 114, 133
 Habenaria calvilabris 181
 Habenaria cornuta 181
 Habenaria culveri 133
 Habenaria disseloides 42
 Habenaria epipactidea 71, 181
 Habenaria galactantha 181
 Habenaria hebes 143
 Habenaria hirsutissima 59
 Habenaria hirsutitrunca 42, 146
 Habenaria holothrix 181
 Habenaria holubii 181
 Habenaria humilior 114, 146
 Habenaria ichneumonea 181
 Habenaria kraenzliniana 114
 Habenaria loevigota 133
 Habenaria leucotricha 146
 Habenaria livingstoniana 37
 Habenaria macrotidion 154
 Habenaria mossambicensis 59
 Habenaria mossii 102
 Habenaria nykense 40
 Habenaria orthocentron 154
 Habenaria pasmithii 20, 143
 Habenaria petraea 37
 Habenaria pubidens 37, 143
 Habenaria pubipetala 42
 Habenaria rautaneniana 91, 181
 Habenaria riparia 37
 Habenaria singularis 175

Habenaria stenorrhynchus 181
 Habenaria subaequalis 175
 Habenaria subarmata 91
 Habenaria tridens 181
 Habenaria tubifolia 143
 Habenaria unguilabris 167
 Habenaria velutina 146
 Habenaria weberiana 181
 Habenaria woodii 102
 Habenaria zambesina 181
 Haemanthus amaryllodes 96, 108
 Haemanthus avasmontanus 64
 Haemanthus canaliculatus 97
 Haemanthus coccineus 74
 Haemanthus dasyphyllus 108
 Haemanthus graniticus 97
 Haemanthus lanceifolius 108
 Haemanthus namaquensis 86, 97
 Haemanthus nortieri 97
 Haemanthus paucifolius 108, 124
 Haemanthus pole-evansii 161
 Haemanthus pubescens 86, 97, 108
 Haemanthus pumilio 97
 Haemanthus tristis 108
 Haematophyllum dinteri 80
 Hagenia abyssinica 155
 Hallee rubrostipulata 155
 Hallee stipulosa 143
 HAMAMELIDACEAE 36, 165
 Harpagophytum procumbens 19, 82
 Harpagophytum zeyheri 19
 Hartmanthus hallii 69
 Hartmanthus pergamentaceus 69
 Haworthia bifolia 127, 131
 Hebenstretia oatesii 169
 Helichrysum acervatum 172
 Helichrysum alticolum 99
 Helichrysum amplexans 109
 Helichrysum archeri 118
 Helichrysum argylepis 131
 Helichrysum atrixifolium 131
 Helichrysum aureolum 131
 Helichrysum aureum 99, 131
 Helichrysum bullatum 34
 Helichrysum chaisei 172
 Helichrysum chrysargyrum 131
 Helichrysum citricephalum 99
 Helichrysum cochleariforme 109
 Helichrysum dasyanthum 131
 Helichrysum densiflorum 34
 Helichrysum dichrolepis 34
 Helichrysum difficile 131
 Helichrysum epheles 110
 Helichrysum flommeiceps 41
 Helichrysum fourcadei 99
 Helichrysum galpinii 131
 Helichrysum graniticola 172
 Helichrysum haygarthii 99
 Helichrysum hilliardiae 34
 Helichrysum incarnatum 110
 Helichrysum ingomense 99
 Helichrysum isolepis 110
 Helichrysum jubilatium 110
 Helichrysum leptorhizum 118
 Helichrysum longinquum 110
 Helichrysum maestum 163
 Helichrysum mariepscopium 110
 Helichrysum micropoides 110
 Helichrysum milleri 110, 124
 Helichrysum mimetes 131
 Helichrysum mixtum 131
 Helichrysum mutabile 131
 Helichrysum nimbicola 99
 Helichrysum palustre 28, 110
 Helichrysum patulifolium 41
 Helichrysum petraeum 131
 Helichrysum polioides 35
 Helichrysum pulchellum 110
 Helichrysum recurvatum 100
 Helichrysum reflexum 131
 Helichrysum rhodellum 172
 Helichrysum rutilans 110
 Helichrysum saxicola 110
 Helichrysum serpentinicola 179
 Helichrysum sessile 110
 Helichrysum simulans 110
 Helichrysum solitarium 99
 Helichrysum sordidum 35
 Helichrysum spencerianum 172
 Helichrysum synccephalum 39
 Helichrysum tithonioides 35
 Helichrysum tomentosulum 76
 Helichrysum tongense 131
 Helichrysum transmontanum 131

Helichrysum tricoctatum 110
 Helichrysum truncatum 131
 Helichrysum whyteanum 35
 Helichrysum wilmsii 131
 Helichrysum woodii 110
 Heliophila carnosia 77
 Heliophila cornuta 77
 Heliophila coronopifolia 88
 Heliophila deserticola 77
 Hemizygia albiflora 128
 Hemizygia flabelifolia 57, 174
 Hemizygia floccosa 81
 Hemizygia modesta 128
 Hemizygia ortrephes 174
 Hemizygia petiolata 132
 Hemizygia pretoriae 132
 Hemizygia stalmansii 125
 Hemizygia transvaalensis 132
 Hermannia amabilis 84
 Hermannia micropetala 60
 Hermestaedia argenteiformis 74
 Hermestaedia spathulifolia 74
 Herschelia chimonimaniensis 175
 Herschelia excelsa 102
 Herschelianthe barbota 101
 Herschelianthe chimanimaniensis 175
 Herschelianthe forcipata 101
 Herschelianthe forcifera 113
 Herschelianthe lugens 101, 113
 Herschelianthe multifida 113
 Herschelianthe newdigatae 102
 Herschelianthe praecox 40
 Herschelianthe schlechteriana 102
 Herschelianthe spatulata 102, 113
 Herschelianthe venusta 113
 Hesperantha ballii 165
 Hesperantha crocopsis 29
 Hesperantha umbricola 132
 Hesseo bruce-boyeri 97
 Hesseo cinnamomea 97
 Hesseo incana 108
 Hesseo mathewii 97
 Hesseo pilosa 108
 Hesseo pulcherrima 108
 Hesseo pusilla 97
 Hesseo stenosphon 108
 Hesseo tenuipedicellata 97
 Hesseo undosa 97
 Hesseo sp. 97
 Heterolepis mitis 99
 Heteromorpha arborescens 86
 Heteromorpha papillosa 74
 HETEROPYXIDACEAE 128
 Heteropyxis canescens 128
 Heterosama galpinii 129
 Hexabulus mossambicensis 49
 Hexacystis dickiana 78
 Hexalobus monopetalus 74
 Heywoodia lucens 125
 Hibiscus articulatus 81
 Hibiscus burtt-davyi 36
 Hibiscus gwandensis 175
 Hibiscus rupicola 58
 Hibiscus torrei 51
 Hiernia angolensis 83
 Hionanthera graminea 58
 Hionanthera mossambicensis 58
 Hionanthera torrei 58
 Hippia hirsuta 99
 Hippocratea goetzei 165
 Hippocratea pallens 174
 Hippocratea volkensii 174
 HIPPOCRATEACEAE 132, 165, 174
 Hippicium gorterioides 87
 Holothrix aspera 114
 Holothrix culveri 102
 Holothrix filicornis 71, 114
 Holothrix grandiflora 114
 Holothrix longicornu 102
 Holothrix macowaniana 114, 175
 Holothrix majubensis 102
 Holothrix micrantha 102, 181
 Holothrix mundii 114
 Holothrix pilosa 114
 Holothrix randii 102
 Holothrix tridactylites 143
 Holothrix villosa 91, 114
 Homalium abdessammadii 80, 165
 Homalium dentatum 134
 Homalium molle 144
 Homalium mossambicensis 50
 Hoodia alstonii 64
 Hoodia currorii 75, 162
 Hoodia flava 75

Hoodia gordonii 75
 Hoodia juttiae 64
 Hoodia lugardii 18
 Hoodia lugardii 178
 Hoodia officinalis 64, 87
 Hoodia parviflora 75
 Hoodia pedicellata 64
 Hoodia ruschii 64
 Hoodia triebneri 64
 Huernia hallii 64
 Huernia hislopii 162
 Huernia hystrix 178
 Huernia kirkii 178
 Huernia levyi 18, 87, 178
 Huernia longituba 162
 Huernia namaquensis 87
 Huernia occulta 178
 Huernia plowesii 65
 Huernia procumbens 171
 Huernia thuretii 87
 Huernia urceolata 87
 Huernia verekeri 87, 178
 Huernia volkarti 162, 171
 Huernia zebra 87, 171
 Hugonia elliptica 51
 Hugonia grandiflora 51
 Humea africana 172
 Humularia descampsii 36
 Humularia kapiriensis 141
 Humularia minima 141, 142
 Humularia pseudaschynomene 142
 Humularia submarginalis 152
 Huttonaea woodii 114
 HYACINTHACEAE 25, 29, 68, 80, 90,
 125, 128, 132
 Hydrolea brevistyla 152
 HYDROPHYLLACEAE 81, 152
 Hydrothauma manicatum 147
 Hygrophila cataractae 64
 Hygrophila gracillima 147
 Hyparrhenia anemopaegma 147
 Hypertelis bowkeriana 82
 Hypertelis salsoloides 82
 Hypertelis spergulacea 82
 Hyphaene petersiana 149
 HYPOXIOACEAE
 27, 29, 90, 101, 112, 132, 142, 146, 152
 Hypoxis cuanensis 152
 Hypoxis dinteri 90
 Hypoxis dregei 142
 Hypoxis filiformis 152
 Hypoxis fischeri 142
 Hypoxis goetzei 142
 Hypoxis hemerocallidea 29, 132
 Hypoxis iridifolia 142
 Hypoxis patula 101
 Hypoxis rigidula 152
 Hypoxis uniflora 101
 Hypoxis villosa 142
 Hyptis spicigera 81

ICACINACEAE 165
 Icuria dunensis 50
 ILICEFBRACEAE 41, 152
 Impatiens balsamina 56
 Impatiens hydrogetonoides 149
 Impatiens limnophila 145
 Impatiens psycantha 49
 Impatiens psychadelphoides 49
 Impatiens quisqualis 35
 Impatiens rubromaculata 39
 Impatiens salpinx 49, 172
 Impatiens schulziana 39
 Impatiens shirensis 35
 Indigofera adenoides 80
 Indigofera astragalina 80
 Indigofera baumiana 80
 Indigofera deightonii 152
 Indigofera demissa 80
 Indigofera emarginella 142
 Indigofera filipes 80
 Indigofera flavicans 80
 Indigofera fulgens 58
 Indigofera gairdneriae 80
 Indigofera giessii 90
 Indigofera heterotricha 80
 Indigofera hilaris 36
 Indigofera holubii 80
 Indigofera inhambanensis 80
 Indigofera longepedicellata 180
 Indigofera nudicaulis 80

Indigofera nummulariifolia 80
 Indigofera nyikense 36
 Indigofera parviflora 180
 Indigofera porviflora 180
 Indigofera pechuelii 80
 Indigofera rautanenii 80
 Indigofera seburgensis 180
 Indigofera serpentinicola 174
 Indigofera spatulata 152
 Indigofera tenuis 180
 Inezia speciosa 99
 Inula paniculata 110, 131
 Ipomoea consimilis 57
 Ipomoea ephemeris 57
 Ipomoea fanshawei 145
 Ipomoea milnei 150
 Ipomoea protea 150
 Ipomoea richardiae 141
 Ipomoea stenosphon 111
 Ipomoea venosa 50
 Ipomoea verrucisepala 163
 IRIACEAE 29, 36, 57, 68, 81, 90,
 125, 128, 132, 142, 146, 152, 165
 ISOETACEAE 153, 180
 Isoetes aequinoctialis 153
 Isoetes rhodesiana 180
 Isoetes schweinfurthii 180
 Isoglossa milanienis 34
 Isoplepis inconspicua 119
 Ixora scheffleri 40

J
 Jamesbrittenia beverlyana 26
 Jamesbrittenia carvalhoi 55, 177
 Jamesbrittenia concinna 20
 Jamesbrittenia fodina 177
 Jamesbrittenia integerrima 20
 Jamesbrittenia jurassica 27
 Jamesbrittenia lesutika 26
 Jamesbrittenia megadenia 83
 Jamesbrittenia myriantha 177
 Jamesbrittenia zambesiaca 169
 Jasminum sp. 58
 Jatropha botswanica 19
 Jatropha cervicornis 179
 Jatropha decumbens 90
 Jatropha latifolia 57
 Jatropha loristipula 179
 Jatropha messinica 179
 Jatropha monroi 179
 Jatropha orangeana 79
 Jatropha pachyrrhiza 151
 Jatropha scaposa 54
 Jatropha seineri 141
 Jatropha spicata 179
 Jatropha subaegoloba 57
 Jensenobotrya lossowiana 69
 Jumellea filicomoides 114
 Jumellea walleri 114
 Juniperus procera 35, 164
 Justicia guerkeana 73
 Justicia platyspala 73
 Justicia salvioidea 149
 Juttadinteria albatra 91
 Juttadinteria attenuata 91
 Juttadinteria ausensis 91
 Juttadinteria deserticola 70
 Juttadinteria elizae 91
 Juttadinteria kovsimontana 70
 Juttadinteria simpsonii 70
 Juttadinteria suavissima 70

K
 Koempferia aethiopica 126
 Kalanchoe alticola 131
 Kalanchoe chimanimaniensis 173
 Kalanchoe fernandesii 50
 Kalanchoe hametiorum 54
 Kalanchoe laciniata 88
 Kalanchoe lobata 179
 Kalanchoe luciae 131
 Kalanchoe rogersii 131
 Kalanchoe sexangularis 131
 Kalanchoe velutina 173
 Kalanchoe wildii 179
 Khaya anthotheca 54, 146
 Kirkia dewinteri 68
 KIRKIAEAE 68
 Kniphofia monticola 34
 Kniphofia mulanjeana 34

Kniphofia tysonii 124
 Kniphofia umbrina 124
 Kobresia lehmannii 132
 Kohautia amboensis 92
 Kohautia azurea 83
 Kotschyia africana 142
 Kotschyia imbricata 152
 Kotschyia longiloba 142
 Kotschyia prittwitzii 145
 Kotschyia suberifera 142

L
 Lachenalia buchbergensis 68
 Lachenalia giessii 80
 Lachenalia klinghardtiana 68
 Lachenalia namibiensis 68
 Lachenalia nordenstamii 68
 Lachenalia nutans 50
 Lachenalia pearsonii 90
 Lachnaea aurea 105
 Lachnaea axillaris 105
 Lachnaea capitata 105
 Lachnaea densiflora 105
 Lachnaea eriocephala 116
 Lachnaea filicaulis 105
 Lachnaea glomerata 116
 Lachnaea grandiflora 105
 Lachnaea greytonensis 105
 Lachnaea leipoldtii 105
 Lachnaea oliverorum 105
 Lachnaea purpurea 116
 Lachnaea stokoei 105
 Lachnaea striata 116
 Lachnaea uniflora 105
 LAMIAEAE 36, 40, 41, 57, 68, 81,
 90, 125, 128, 132, 153, 165, 174
 Lannea antiscorbutica 124
 Lannea gossweileri 149
 Lannea schimperii 149
 Lannea schweinfurthii 86, 130
 Lannea stuhlmannii 49
 Lannea virgata 145
 Lantana dinteri 84
 Lannea sp. 56
 Lapeirousia zambesiaca 152
 Lasianthus kilimandscharicus 176
 Lasiocarpus hephoeistis 165
 Lasiopogon minutus 99
 Lasiopogon ponticus 66, 110
 Lasiopogon volkii 76
 LAURACEAE 132, 153, 165
 Laurentia giftbergensis 120
 Laurentia longitubus 101
 Laurentia mariae 112
 Lavrania haagnerae 65
 Lavrania marlothii 75
 Lavrania perlata 65
 Lavrania picta 65, 75
 Lebeckia dinteri 68
 Lebeckia halenbergensis 80
 Lebeckia obovata 90
 Ledebouria scabrata 90
 LEGUMINOSAE 25, 29, 50, 51, 54, 58,
 128, 133, 165, 174, 180.
 See also FABACEAE
 Leiothylax drummondii 154
 Lellingeria oosora 39
 LENTIBULARIAEAE 153
 Leptactinia delagoensis 176
 Leptochloa uniflora 91
 Lessertia acanthorhachis 80
 Lessertia cryptantha 90
 Lessertia eremicola 80
 Lessertia glabraculis 29
 Lessertia thodei 29
 Leucas aggerestrus 174
 Leucas hephaestis 165
 Leucospermum gerrardii 129
 Leucosphaera bainesii 74
 Limeum aethiopicum 82
 Limeum arenicolum 82
 Limeum argute-carinatum 82
 Limeum dinteri 82
 Limeum fenestratum 82
 Limeum myosotis 82
 Limeum pterocarpum 82
 Limeum sulcatum 82
 Limeum viscosum 82
 Limnophila crassifolia 155
 LINACEAE 51
 Liparis chimanimaniensis 175
 Liparis hemiploides 59

Liparis molendinacea 154
 Liparis sp. 175
 Lipocarpa echinus 150
 Lipocarpa robinsonii 150
 Lithops dinteri 70
 Lithops francisci 70
 Lithops fulviceps 70
 Lithops gesineae 70
 Lithops gracilidelineata 70
 Lithops hermetica 70
 Lithops herrei 70
 Lithops julii 70
 Lithops karasmontana 70
 Lithops pseudotruncatella 70
 Lithops ruschiorum 70
 Lithops schwantesii 70, 71
 Lithops vallis-mariae 71
 Lithops wernerii 71
 Lobelia blantysensis 36
 Lobelia cobaltica 51, 174
 Lobelia coddii 133
 Lobelia corniculata 129
 Lobelia erinus 81, 112
 Lobelia hereroensis 68
 Lobelia limosa 101
 Lobelia lobata 165
 Lobelia muscoides 112
 Lobelia nugax 101
 Lobelia oreae 120
 Lobelia pinifolia 112
 Lobelia stricklandae 101, 165
 Lobelia trullifolia 101
 Lobelia valida 101
 Lobelia zwartkopensis 101
 Lobelia sp. 101
 LOBELIACEAE 36, 51, 68, 81, 101, 112,
 119, 129, 133, 146, 165, 174, 180
 LOGANIACEAE 58, 165
 LOMARIOPSIDACEAE 40, 41, 174
 Lomariopsis warneckii 41, 175
 Lophachme parva 147
 Lophiopus latifolius 78
 Lophiopus polystachyus 78
 Lophiopus tenuissimus 78
 Lopholaena alata 149
 Lopholaena whyteana 35
 LORANTHACEAE 51, 54, 81, 90, 133
 Lotononis bainesii 80
 Lotononis bracteosa 80
 Lotononis linearifolia 90
 Lotononis listii 26
 Lotononis maculata 90
 Lotononis mirabilis 68
 Lotononis pachycarpa 68
 Lotononis pallidirosea 90
 Lotononis platycarpa 80
 Lotononis schreberi 80
 Lotononis serpentinicola 174
 Lotononis stricta 26
 Lotononis strigillosa 80
 Lotononis tenuis 80
 Lotus mlanjeanus 41
 Lovoa swynnertonii 166
 Loxodera bovonei 154
 Lycium grandicalyx 84
 LYCOPODIACEAE 36, 180
 Lycopodium phlegmaria 36, 180
 LYTHRACEAE 18, 41, 51, 54, 58,
 81, 129, 133, 153, 180

M
 Macowanina conferta 99
 Macowanina corymbosa 110
 Macowanina deflexa 99
 Macowanina hamata 99
 Macrotylis barbiger 105
 Macrotylis cassioides 105
 Macrotylis cauliflora 120
 Macrotylis hirta 105
 Macrotylis ramulosa 105
 Macrotylis villosa 105, 116
 Maerua acuminata 56
 Maerua andradiae 49
 Maerua angolensis 78
 Maerua brunneus 56
 Maerua gilgii 78
 Maerua juncea 78
 Maerua paniculata 140
 Maerua parvifolia 78
 Maerua salicifolia 163
 Maerua scandens 49
 Maerua schinzii 78

Maeria schliebenii 57
Mairo decumbens 100
Malaxis katangensis 143
Malephora crocea 91
Mallotus oppositifolius 164
MALPIGHIACEAE 51, 58, 153, 166, 180
MALVACEAE 26, 29, 36, 51, 58, 81, 146, 175, 180
Manilkara concolor 129, 169
Manilkara discolor 129, 176
Manulea dubia 83
Manulea gariepina 83
Manulea namibensis 83
Manulea rhodesiana 182
Manulea tenella 92
Manuleopsis dinteri 83
Marasmodes duemmeri 99
Marasmodes oligocephalus 99
Marasmodes undulata 99
Marcellipsis denuata 74
Marcellipsis splendens 74
Marcellipsis welwitschii 74
Margaritaria discoidea 128
Marlothiella gummifera 94
Marsilea fenestrata 133
MARSILEACEAE 133
Massonia echinata 90
Motricaria schlechteri 99
Maytenus acuminata 39
Maytenus chasei 163
Maytenus heterophylla 172
Maytenus mossambicensis 49
Maytenus oxycarpa 172
Maytenus pubescens 172
Megalochlamys marlothii 73
Meiostemon tetrandrus 140
Melanospermum italae 126
Melanospermum swazicum 126
MELASTOMATACEAE 36, 40, 41, 51, 58, 142, 146, 153, 166, 175
MELIACEAE 54, 81, 90, 133, 146, 153, 166, 180
MELIANTHACEAE 81, 133
Melanthus pectinatus 81
Mellera nyassana 178
Mellera submutica 178
Memecylon insulare 51
Memecylon sessilicarpum 58
Memecylon sousae 58
Memecylon torrei 58
Memecylon zambeziense 142
Memecylon sp. 58
MENISPERMACEAE 54, 58, 81, 166
MENYANTHACEAE 146, 153
Merremia bipinnatifidata 78
Merremia dissecta 111
Merremia guericchii 78
Merremia malvifolia 119
Merremia stellata 150
Merremia xanthophylla 173
Merxmüllera aureocephala 30
Merxmüllera guillarmodiae 30
Mesanthemum africanum 57, 173
MESEMBRYANTHEACEAE 29, 68, 81, 91, 166
See also AIZOACEAE
Mesembryanthemum pellitum 82
Micrargeriella aphylla 144
Microcoelia corallina 42
Microcoelia megalorrhiza 42
Microcoelia obovata 102
Microcoelia ornithocephala 42
Microloma calycinum 75
Microloma hereroense 75
Microloma incanum 75
Microloma longitubum 75
Microloma penicillatum 75
Microloma poilanthum 65
Microsorium pappei 176
Milicia excelsa 36, 54, 142, 166
Milletia bussei 58
Milletia eetveldeana 52
Milletia mossambicensis 154
Milletia stuhlmannii 54
Mimosa mossambicensis 51
Mimosa pigra 80
MOLLUGINACEAE 71, 82, 91
Mollugo walteri 82
Momordica henriquesii 57
Momordica welwitschii 78
Momordica sp. 57
Monadenia cernuo 113
Monadenia ecolorato 101
Monadenia leydenburgensis 129

Monadenia microstachya 101
Monadenia physodes 102
Monadenia pygmaea 120
Monadenia subulosa 102
Monadenium discoideum 141
Monadenium farschawei 151
Monadenium filiforme 141
Monadenium friesii 141
Monadenium hirsutum 141
Monadenium kimberleyana 179
Monadenium parviflorum 41
Monadenium pseudoracemosum 141
Monadenium pudibundum 141
Monadenium simplex 141
Monadenium torrei 57
Monanthotaxis buchananii 161
Mondia whitei 98, 133
Monechma cleomoides 73
Monechma desertorum 73
Monechma genistifolium 73
Monechma grandiflorum 73
Monechma mollissimum 73
Monechma salsola 73
Monechma serotinum 64
Monechma tonsum 73
Monopsis flava 112
Monopsis kowyensis 112
Monopsis malvacea 133
Monopsis stellarioides 146
Monopsis unidentata 112
Monopsis varifolia 101
MONTINIACEAE 51
MORACEAE 36, 41, 51, 54, 58, 82, 91, 125, 129, 133, 142, 146, 153, 166, 175
Moraea brevifolia 146
Moraea carsonii 81
Moraea garipensis 68
Moraea graniticola 68
Moraea hexaglottis 68
Moraea namibensis 68
Moraea pallida 90
Moraea polystachya 81
Moraea rigidifolia 90
Moraea venenata 81
Morella serrata 26
Morinda asteroscepa 38
Moringa ovalifolia 82
MORINGACEAE 82
Morus mesozygia 37, 146, 166
Multidentia exserta 168
Myrica serroto 26
MYRICACEAE 26
MYRSINACEAE 40, 142, 153
MYRTACEAE 54, 58
Myxopappus hereroensis 76

N

Namacodon schinzianum 66
Namaquanula bruce-bayeri 64, 97
Namibia cinerea 71
Namibia pomonae 91
Namibia ponderosa 91
Nananthus aloides 20, 71
Nananthus margaritifera 20, 71
Necepsia castaneifolia 164
Nectaropetalum carvalhoi 57
Nemesia fruticans 83
Nemesia karasbergensis 72
Nemesia violiflora 72
Neobolusia ciliata 167
Neobolusia stolzii 167
Neobolusia tysonii 114, 133
Neoluederitzia sericeocarpa 72
Neopolisso costoneifolia 164
Neopateronia falcata 90
Neorautanenia amboensis 80
Neoschumannia cardinea 178
Neptunia oleracea 80
Nerine angustifolia 127
Nerine bowdenii 108
Nerine duparquetiana 86
Nerine gibsonii 118
Nerine gracilis 97
Nerine humilis 108
Nerine huttoniae 97
Nerine laticoma 74
Nerine marincowitzii 97
Nerine masoniorum 97
Nerine pancratoides 108
Nerine gracilis 97
Nerine humilis 108
Nerine huttoniae 97
Nerine laticoma 74
Nerine marincowitzii 97
Nerine masoniorum 97
Nerine pancratoides 108
Nerine plotypetolo 108
Nerine pudica 108
Nerine pusilla 86

Nerine sp. 118
Nervilia bicarinata 114, 146
Nervilia kotschy 114, 154
Nervilia renschiana 114, 154
Nesaea alata 129
Nesaea gazensis 58
Nesaea linearis 54
Nesaea minima 18
Nesaea moggii 51
Nesaea pedroi 51
Nesaea purpurascens 153
Nesaea pygmaea 51
Nesaea ramosa 51
Nesaea ramosissima 51
Nesaea robinsoniana 153
Nesaea sagittifolia 133
Nesaea schinzii 81
Nesaea spatulata 131
Nesaea zambatis 53
Newtonia hildebrandtii 127
Nicolasia heterophylla 87
Nicolasia nitens 87
Nicolasia pedunculata 87, 179
Nicolasia stenoptera 87, 88
Nicotiana africana 72
Nidorella nordenstamii 66
Nidorella resedifolia 88, 172
Nolletia tenuifolia 88
NYCTAGINACEAE 82, 91
Nymphaea lotus 82
NYMPHAEACEAE 82
Nymphoides milnei 153
Nymphoides tenuissima 146

O

Oberonia disticha 42, 120
Obetia carruthersiana 84
Ochna afzeloides 166
Ochna angustata 54
Ochna arborea 133
Ochna beivensis 51
Ochna gamostigmata 133
OCHNACEAE 51, 54, 133, 166
Ocotea kenyensis 132, 165
Oceoclades decaryana 167
Oceoclades quadriloba 167
OLACACEAE 82
Olax dissitiflora 82
Oldenlandia corymbosa 155
Oldenlandia geophila 143
Oldenlandia robinsonii 155
Oldenlandia verrucitesta 52
Oldenlandia sp. 59
Olea chimanimani 58
Olea woodiana 133
OLEACEAE 58, 82, 129, 133, 142, 153
Oligophyton drummondii 167
Olinia emarginata 133
OLINIACEAE 133
Oncoba spinosa 80
Oncocalyx welwitschii 81
Oncosiphon schlechteri 99
Ondetia linearis 76
OPHILOGLOSSACEAE 40
Ophioglossum thomasi 40
Ophrestia brevifracosa 142
Ophrestia unicostata 152
Opilia campestris 82
OPILLIACEAE 82
Orbea albocastanea 87
Orbea huillensis 87
Orbea lugardii 87
Orbea lutea 87
Orbea maculata 87, 178
Orbea paradoxa 127
Orbea schweinfurthii 87
Orbea tapscottii 18
Orbea umbracula 178
Orbea valida 87
Orbeanthus porodoxo 127
Orbeopsis caudata 162
Orbeopsis gerstneri 124
Orbeopsis gossweileri 178
Orbeopsis lutea 162
Orbeopsis valida 162
ORCHIDACEAE 18, 20, 29, 37, 40, 41, 59, 71, 82, 91, 101, 112, 120, 125, 129, 133, 142, 146, 153, 166, 175, 180
Oreobambos buchwaldii 143, 168
Oreosyce africana 111
Ormocarpum kirkii 80
Ornithogalum apertum 90

Ornithogalum candidum 80
Ornithogalum capillare 132
Ornithogalum deltoideum 68
Ornithogalum geniculatum 68
Ornithogalum glandulosum 80
Ornithogalum hispidum 90
Ornithogalum merxmülleri 68
Ornithogalum monophyllum 132
Ornithogalum nanodes 80
Ornithogalum ornithogaloideis 80
Ornithogalum prasinum 90
Ornithogalum puberulum 68
Ornithogalum pulchrum 80
Ornithogalum rautanenii 80
Ornithogalum saundersiae 132
Ornithogalum seineri 80
Ornithogalum setifolium 90
Ornithogalum stapfii 81
Ornithogalum subcoriaceum 81, 90
Ornithogalum tenuifolium 90
Ornithogalum toxicarium 81
Ornithogalum tubiforme 81
Ornithogalum unifolium 81
Ornithoglossum calcicola 78
Orphanthera alba 75
Orphanthera jasminiflora 75
Orthosiphon vernalis 128
Osteospermum aciphyllum 99
Osteospermum armatum 88, 110
Osteospermum attenuatum 110
Osteospermum elsieae 99
Osteospermum hafstroemii 100
Osteospermum hirsutum 100
Osteospermum hispidum 100
Osteospermum montanum 76
Osteospermum muricatum 76
Osteospermum pterigoideum 100
Osteospermum wollionum 98
Osyris lanceolata 83
Othonna abrotanifolia 110
Othonna armiana 110
Othonna brandbergensis 76
Othonna burttii 28, 110
Othonna cacalioides 100
Othonna cakilefolia 100
Othonna clavifolia 66
Othonna cyclophylla 66
Othonna graveolens 76
Othonna hallii 100
Othonna lasiocarpa 76
Othonna lepidocaulis 100
Othonna linearifolia 118
Othonna membranifolia 100
Othonna papaveroides 100
Othonna patula 100
Othonna petiolaris 110
Othonna pinnatlobata 118
Othonna protecta 76
Othonna rechiageri 100
Othonna retrorsa 110
Othonna sparsiflora 76
Othonna spinescens 100
Othonna tephrosioides 118
Otiophora angustifolia 148
OXALIDACEAE 40, 71, 91, 143, 154
Oxalis abercornensis 154
Oxalis ausensis 71
Oxalis chapmaniae 40
Oxalis extensa 91
Oxalis laxicaulis 91
Oxalis luederitzii 71
Oxalis pseudo-cernua 91
Oxalis schaeferi 71
Oxyanthus goetzei 42
Oxyanthus notolensis 125
Oxyanthus pyramidalis 125
Oxygonum carnosum 154
Oxygonum litorale 154
Ozoroa bredoi 149
Ozoroa concolor 74
Ozoroa dispar 74
Ozoroa gomeziana 49
Ozoroa insignis 86
Ozoroa kassneri 145
Ozoroa longepetiolata 171
Ozoroa longipes 74
Ozoroa namaensis 74
Ozoroa namaquensis 64
Ozoroa okavangensis 86
Ozoroa reticulata 39, 54
Ozoroa schinzii 74
Ozoroa viridis 149

P

Pachites appressa 114
Pachites bodkinii 114
Pachycarpus galpinii 127
Pachycarpus graminifolius 171
Pachycarpus lineolatus 87
Pachycarpus stelliceps 124
Pachycymbium keithii 171
Pachycymbium lugardii 178
Pachycymbium rogersii 162
Pachycymbium schweinfurthii 171
Pachycymbium ubomboense 127, 178
Pachypodium lealii 75
Pachypodium namaquanum 75
Pachypodium saundersii 162
Pachystigma albosetulosum 155
Pachystigma micropyren 155
Pancovia golungensis 169
Pandiaka confusa 145
Pandiaka richardsiae 145
Panicum bullockii 147
Panicum coloratum 20
Panicum coloratum 20
Panicum gilvum 20
Panicum loevisfolium 20
Panicum nymphaeoides 40
Panicum perangustatum 154
Panicum peteri 55
Panicum phippisii 154
Panicum pilgerianum 20
Panicum pleianthum 55
Panicum pseudoracemosum 147
Paralepistemon shirensis 111
Parquetina nigrescens 168
Passerina burchellii 105
Passerina ericoides 12
Passerina esterhuseniae 117
Passerina filiformis 17
Passerina nivicola 117
Passerina paludosa 106
PASSIFLORACEAE
 51, 71, 82, 133, 143, 147, 154, 168, 175, 181
Pauridia longituba 101
Pauridiantha symlocoides 176
Pavetta barbertonensis 129
Pavetta catophylla 59
Pavetta comostyla 38, 176
Pavetta gracillima 59
Pavetta incana 59
Pavetta johnstonii 143
Pavetta klotzschiana 59
Pavetta kyimbilensis 38
Pavetta microlancea 134
Pavetta mocambicensis 59
Pavetta mulleri 168
Pavetta pumila 59
Pavetta pygmaea 155
Pavetta redheadii 143
Pavetta revoluta 59
Pavetta subumbellata 38, 144
Pavetta tendaguruensis 59
Pavetta zeyheri 134
Pavetta sp. 182
Pavonia rehmannii 81
Pavonia rogersii 180
Pearsonia metallifera 174
PEDALIACEAE 19, 71, 82
Pegoletia oxydonta 76
Pegoletia pinnatilobata 76
Pegoletia plumosa 76
Pegoletia retrofracta 77
Pegoletia senegalensis 77
Pelargonium oppositifolium 29
Pelargonium otaviense 80
Pellaea angulosa 37, 168
Peltophorum africanum 80
Pennisetum foermerianum 83
Pentagonanthus grandiflorus 154
Pentania confertifolia 144
Pentarrhinum abyssinicum 75
Pentarrhinum insipidum 75
Pentastichus micrantha 134
Pentastichus praecox 30
Pentatrichia alata 110
Pentatrichia avasmontana 66
Pentatrichia rehmanii 88
Pentzia tomentosa 66
Pepomium caledonicum 163
Pepomium sp. 57
Pergularia daemia 75
Pericopsis angolensis 90
Periploca nigrescens 168
PERILOACEAE 133, 154, 168.

See also APOCYNACEAE

Peristrophe grandibracteata 73
Peristrophe hereroensis 73
Peristrophe nambensis 73
Peristrophe serpentina 161
Peristrophe transvaalensis 130
Petalidium angustitubum 73
Petalidium bracteatum 73
Petalidium canescens 73
Petalidium cirrhiferum 73
Petalidium coccineum 73
Petalidium crispum 73
Petalidium cymbiforme 73
Petalidium englerianum 73
Petalidium giessii 73
Petalidium halimoides 73
Petalidium lanatum 73
Petalidium linifolium 73
Petalidium lucens 73
Petalidium luteo-album 73
Petalidium pilosi-bracteolatum 73
Petalidium ramulosum 73
Petalidium rossmannianum 73
Petalidium setosum 73
Petalidium spiniferum 86
Petalidium variabile 74
Phacelus frankiae 30
Pharanceum brevicaulis 82
Phaulopsis semiconica 64
Phyltidocarpa flava 74
PHORMIACEAE 168
Phragmanthera dombeyae 81
Phragmanthera glaucocarpa 81
Phragmanthera gerichii 81
Phyllanthus caespitosus 145
Phyllanthus confusus 35
Phyllanthus friesii 151
Phyllanthus martinii 151
Phyllanthus medonae 57
Phyllanthus microdendron 145
Phyllanthus nyikae 36
Phyllanthus polyanthus 145
Phyllanthus pseudocarunculatus 151
Phyllanthus sananei 151
Phyllanthus serpentinicola 173
Phyllanthus tener 151
Phyllanthus tenuis 145
Phyllanthus xiphiophorus 151
Phyllanthus zambicus 145
Phyllopodium hispidulum 84
Phymaspermum bracteosa 100
Phymaspermum erubescens 100
Phymaspermum schroteri 100
Phymaspermum villosum 100
Piaranthus decipiens 87
Piaranthus decorus 75
Pimpinella mulanjensis 34
Platyterium alciornae 168
Platyterium elephantotis 42
Platycoryne affinis 167
Platycoryne brevirostris 143
Platycoryne isoetifolia 146
Platycoryne latipetala 146
Platycoryne micrantha 146
Platycoryne protearum 146
Platycoryne trilobata 154
Platylepis glandulosa 42, 114, 146, 175
Plectostachys polifolia 131
Plectranthastrum cylindricalyx 153
Plectranthus acutulus 40
Plectranthus caudatus 174
Plectranthus crassus 36
Plectranthus dinteri 81
Plectranthus dissectus 41
Plectranthus elegans 41
Plectranthus hereroensis 81
Plectranthus kapaensis 58
Plectranthus malawensis 41
Plectranthus mandalensis 36
Plectranthus porphyranthus 174
Plectranthus psammophilus 58
Plectranthus rubropunctatus 132
Plectranthus unguentarius 68
Plectranthus zebrarum 40
Plectranthus zombensis 41
Plectranthus zuluensis 132
Pleiotaxis angustirigosa 149
Pleiotaxis oxylepis 140
Plicosepalus kalachariensis 81
Plicosepalus undulatus 81
Plinthus rehmannii 86
PLUMBAGINACEAE 71, 83
Plumbago pearsonii 83
Plumbago wissii 71

POACEAE 20, 26, 30, 37, 40, 51, 54, 59, 83, 91, 129, 133, 143, 147, 154, 168, 176, 181
PODOCARPACEAE 59
Podocarpus falcatus 59
PODOSTEMACEAE 154
Pogonarthria leiandra 83
Pogonarthria refracta 147
Polyalthia mossambicensis 56
Polygala francisci 52
Polygala friesii 147
Polygala golpinii 129
Polygala guericiana 83
Polygala lasiosepalis 91
Polygala limae 59
Polygala nyikensis 40
Polygala torrei 59
Polygala westii 182
POLYGALACEAE 40, 52, 59, 83, 91, 129, 143, 147, 182
POLYGONACEAE 154
POLYPODIACEAE 42, 168, 176
Polystachya albescentis 114, 129
Polystachya asper 154
Polystachya calluniflora 42
Polystachya erythrocephala 154
Polystachya goetzeana 42
Polystachya golungensis 167
Polystachya holmesiana 42
Polystachya johnstonii 37
Polystachya kaluluensis 37
Polystachya lawrenceana 42
Polystachya lindblomii 167
Polystachya mafingensis 42, 154
Polystachya minima 37
Polystachya moreauae 154
Polystachya mzuensis 37
Polystachya phirii 175
Polystachya pubescens 167
Polystachya purpureobracteata 37
Polystachya songaniensis 40
Polystachya subumbellata 167
Polystachya valentina 175
Polystachya zuluensis 120, 129
Polystichum dracomontanum 29
Polystichum macleae 132
Polystichum transkeiense 132
Portulaca foliosa 83, 147
Portulaca rhodesiana 182
PORTULACACEAE 18, 30, 83, 147, 182
Portulacaria armiana 83
Pouzolzia bracteosa 156
Prismatocarpus cordifolius 111
Prismatocarpus decurrens 111
Prismatocarpus fastigiatus 119
Prismatocarpus hispidus 111
Prismatocarpus implicatus 111
Prismatocarpus lycioides 111
Prismatocarpus pauciflorus 111
Prismatocarpus pilosus 111
Prismatocarpus spinosus 111
Priva auricoccea 72
Protea asymmetrica 182
Protea caffra 26, 37, 40, 143
Protea comptonii 125
Protea enervis 176
Protea gagei 91
Protea inyanganiensis 182
Protea kibarensis 143
Protea multibracteata 26
Protea multibracteata 26
Protea neocrinita 168
Protea parvula 125
Protea poggei 154
Protea roupelliae 26
PROTEACEAE 26, 37, 40, 42, 91, 125, 129, 134, 143, 154, 168, 176, 182
Prunus africana 30, 37, 125, 147
Psammophora longifolia 91
Psammophora modesta 82
Psammophora nissenii 71
Psammophora saxicola 71
Pseudocalyx saccatus 178
Pseudomussaenda mozambicensis 59
Pseudopropolis fischeri 142
Pseudosbeckia swynertonii 51, 175
Psilocaulon salicornioides 82
Psilochloa pilgeriana 20
PSILOIACEAE 129, 147
Psilotum nudum 129, 147
Psychotria albidocalyx 55
Psychotria amboniana 55
Psychotria mwinilungae 144
Psychotria pumila 155
Psychotria zombamontana 40

Psychotria sp. 59
Psydrax micans 59
Psydrax moggii 60
Psydrax obovata 168
Psydrax whitei 144
PTAEROXYLACEAE 83
Ptaeroxylon obliquum 83
Pteleopsis barbosae 50
Pteleopsis myrtifolia 39
PTERIDACEAE 37, 40, 42, 155, 168
Pterocarpus angolensis 36, 68, 174
Pterocarpus centenii 50
Pteroglossaspis cymbosa 154
Pteronia diosmifolia 100
Pteronia eenii 77
Pteronia pillansii 100
Pteronia polygalifolia 77
Pteronia rangei 88
Pteronia scabra 100
Pteronia spinulosa 66
Pteronia tenuifolia 110
Pterygodium connivens 102
Pterygodium cruciferum 102
Pterygodium newdigatae 102, 114
Pterygodium penterianum 114
Pterygodium schelpei 114
Pycneus acutulus 41
Pycneus atrorubidus 150
Pycneus heterochrous 150
Pycneus micromelas 150
Pycneus okavangensis 19
Pycneus poikilostachys 150
Pycneus spissiflorus 35
Pyrenacantha kirkii 165
Pyrostria bibracteata 169
Pyrostria chapmanii 38

Q

Quaqua acutiloba 65
Quaqua incarnata 65
Quaqua mammillaris 75
Quaqua pruinosa 65

R

Rabiea leslei 29
Raphia australis 56
Raphia farinifera 162
Raphionacme chimanimaniensis 98, 171
Raphionacme elsansa 98
Raphionacme lobulata 98
Raphionacme lucens 98
Rastrophylum pinnatifidum 149
Rawsonia burtt-davyi 36
Rawsonia reticulata 41
Rennera eenii 77
Rennera laxa 20
Rennera limnophila 77
Restio milanjanus 37
Restio quartziticola 59
RESTIONACEAE 37, 59
Rhadamanthus fasciatus 68
Rhadamanthus namibensis 68
Rhadamanthus secundus 68
RHAMNACEAE 59
Rhigiophyllum squarrosum 111
Rhigozum virgatum 77
RHIZOPHORACEAE 52, 134, 143
Rhodognaphalon mossambicense 49
Rhodohypoxis incompta 112
Rhodohypoxis rubella 112
Rhodohypoxis thodiana 27, 112
Rhus acuminatissima 39
Rhus grandidens 127
Rhus longipes 145
Rhus lucens 171
Rhus monticola 34
Rhus ochracea 149
Rhus problematodes 74
Rhus pyroides 28
Rhus refracta 49
Rhus rehmanniana 56
Rhus rogersii 130
Rhus tenuipes 171
Rhus tomentosa 171
Rhus tunicola 171
Rhus wildii 171
Rhynchosia chimanimaniensis 51
Rhynchosia clivorum 41
Rhynchosia dieterlenae 29
Rhynchosia stipata 174

Rhynchosia totta 180
 Rinorea arborea 169
 Rinorea convallarioides 177
 Rinorea elliptica 169
 Rinorea ferruginea 177
 Rinorea ilicifolia 169
 Roella bryoides 111
 Roella compacta 111
 Roella cuspidata 111
 Roella goodiana 100
 Roella incurva 111
 Roella incurva 111
 Roella latifolia 119
 Roella lightfootioides 111
 Roella prostrata 111
 Roella rhodantha 111
 Roella spicata 111
 Roeperocharis wentzeliana 146
 Rogeria bigibbosa 82
 Rogeria longiflora 82
 Romulea luteoflora 29
 ROSACEAE 20, 30, 37, 102, 115, 120, 125, 147, 155
 Rotala cordipetala 153
 Rotala dinteri 81, 153
 Rotala gossweileri 153
 Rotala juniperina 41, 153
 Rotala myriophyllifolia 153
 Rotala submersa 153
 Rotala wildii 180
 Rourea minor 50
 Rourea orientalis 78
 RUBIACEAE 38, 40, 42, 52, 55, 59, 83, 92, 125, 129, 134, 143, 147, 155, 168, 176, 182
 Ruellia aspera 74
 Ruellia brandbergensis 74
 Ruellia curroii 64
 Ruellia diversifolia 74
 Ruellia otaviensis 86
 Ruelllopsis setosa 178
 Ruschia namusmontana 91
 Ruschianthemum gigas 71
 Ruschianthus falcatus 91
 RUTACEAE 26, 38, 52, 60, 71, 83, 103, 115, 120, 134, 144, 148, 155, 169, 176
 Rytigynia adenodonta 38, 144
 Rytigynia bugoyensis 38
 Rytigynia macrura 176
 Rytigynia pawekiae 38
 Rytigynia umbellulata 169
 Rytigynia sp. 155, 182

S

Salacia erecta 165
 Salacia gerrardii 132
 Salacia leptoclada 165
 Salpinctum hirsutum 130
 Salsola sp. 57
 SAMYDACEAE 134, 144
 Sandersonia aurantiaca 131
 Samiella occidentalis 112
 Sansevieria pearsonii 78
 SANTALACEAE 20, 42, 83, 92, 134, 176
 Santaloides afzelii 163
 SAPIINDACEAE 18, 38, 52, 55, 60, 92, 126, 148, 169, 176
 Sapium acetosella 151
 SAPOTACEAE 42, 126, 129, 169, 176
 Sarcocaulon inerme 80
 Sarcocaulon marlothii 80
 Sarcocaulon mossamedense 80
 Sarcocaulon patersonii 80
 Sarcocaulon pobeuginii 155
 Sarcocornia mossambicensis 49
 Sarcocornia natalensis 49
 Sarcostemma pearsonii 75
 Sarcostemma viminale 75
 Sardinia jucunda 133
 Sardinia sp. 133
 Sotyrnidium rostratum 115
 Satyrium afroontanum 37
 Satyrium carneum 114
 Satyrium ecalcaratum 42
 Satyrium flavum 167
 Satyrium foliosum 114
 Satyrium hallackii 102
 Satyrium longicaudo 102
 Satyrium microcorps 143
 Satyrium microrhynchum 30, 114
 Satyrium mirum 167
 Satyrium monadenum 143
 Satyrium muticum 102

Satyrium princeae 143
 Satyrium princeps 114
 Satyrium pulchrum 102
 Satyrium rhodanthum 102
 Satyrium rhynchanthum 115
 Satyrium shirens 143
 Scadoxus multiflorus 86
 Scadoxus pole-evansii 161
 Scadoxus puniceus 178
 Schefflera abyssinica 140
 Schizochilus cecilii 115, 129, 167
 Schizochilus crenulatus 115
 Schizochilus flexuosus 115
 Schizochilus gerrardii 120
 Schizochilus lilacinus 120
 Schizochilus zeyheri 115
 Schizodium longipetalum 102
 Schizodium obliquum 115
 Schizoglossum elingue 28
 Schizoglossum montanum 28
 Schoenoplectus rhodesicus 150
 Schoenoxiphium ecklonii 112
 Schoenoxiphium lehmannii 112, 132
 Schoenoxiphium strictum 119
 Schotia capitata 165
 Schreberia trichoclada 82
 Schwantesia constanceae 71
 Scilla natalensis 29, 128
 Scirpus delicatulus 119
 Scirpus inconspicuus 119
 Scirpus varius 112
 Scleria calicicola 150
 Scleria chlorocalyx 150
 Scleria delicatula 150
 Scleria fulvipilosa 150
 Scleria lucentinigrans 151
 Scleria patula 151
 Scleria polyrhiza 151
 Scleria procumbens 151
 Scleria xerophila 151
 Scleria zambesica 151
 Sclerochiton apiculatus 54
 Sclerochiton coreuleus 56, 178
 Sclerochiton hirsutus 56
 Sclerochiton kirkii 151
 Scolopia mundi 165
 Scolopia oreophila 128
 Scolopia stolzii 152, 173
 SCROPHULARIACEAE 20, 26, 27, 40, 42, 55, 60, 71, 83, 92, 126, 144, 148, 155, 169, 177, 182
 Sebaea africana 152
 Sebaea alata 152
 Sebaea caudata 152
 Sebaea clavata 152
 Sebaea erosa 132
 Sebaea fernandesiana 152
 Sebaea perpusilla 142
 Securidaca welwitschii 143
 Seddera schizantha 78
 SELAGINACEAE 72, 84, 92
 Selaginella imbricata 92, 144, 177
 Selaginella perpusilla 169
 SELAGINELLACEAE 92, 144, 169, 177
 Selago albomarginata 84
 Selago alpececurides 84
 Selago amboensis 84
 Selago anatrachota 177
 Selago angolensis 92
 Selago angustibractea 92
 Selago blantyreensis 40
 Selago centralis 92
 Selago dinteri 84, 92
 Selago divaricata 84
 Selago goetzei 182
 Selago kurtzianii 84
 Selago lepida 72
 Selago nachtigalii 72
 Selago serpentina 169
 Selago swaziensis 126
 Selago swynnertonii 177, 182
 Selago thyrsoides 40, 155, 182
 Selago welwitschii 92
 Selago whyteana 42
 Senecio aetfatensis 163
 Senecio albopunctatus 100, 110
 Senecio alliaifolius 77
 Senecio anopetes 110
 Senecio anthemifolius 110
 Senecio auriculatissima 41
 Senecio austromontanum 28, 110
 Senecio coleophyllus 110
 Senecio diodon 110
 Senecio emimens 100
 Senecio engleranus 77
 Senecio erysimoides 118
 Senecio foeniculoides 110
 Senecio giessii 77
 Senecio haworthii 110
 Senecio mbuluzensis 131
 Senecio medley-woodii 110, 131
 Senecio microspermus 118
 Senecio milanjanus 41
 Senecio mulwanensis 127
 Senecio muirii 110
 Senecio paniculatus 110
 Senecio peltophorus 35
 Senecio puberulus 110
 Senecio pubigerus 110
 Senecio rehmannii 110
 Senecio sariensis 28, 110
 Senecio sarcoides 110
 Senecio scapulosus 100
 Senecio serruroides 100
 Senecio thunbergii 118
 Senecio trachylaenus 119
 Senecio trachyphyllus 119
 Senecio umbellatus 131
 Senecio wittebergensis 100
 Septulina glauca 81
 Septulina ovalis 81
 Sericanthe andongensis 148
 Sericanthe odoratissima 38, 182
 Sericanthe sp. 182
 Sericocoma avolans 86
 Sericocoma heterochiton 74
 Sericocoma pungens 86
 Sesamothamnus benguelensis 82
 Sesamothamnus guerichii 82
 Sesamothamnus leistneri 71
 Sesamum abbreviatum 83
 Sesamum angolense 83
 Sesamum capense 83
 Sesamum marlothii 83
 Sesamum rigidum 83
 Sesamum schinzianum 83
 Sesbania microphylla 80
 Sesbania pachycarpa 80
 Setaria grandis 40
 Setaria homonyma 83
 Setaria obscura 30
 Setaria pseudaristata 147
 Sheilanthra pubens 105
 Sideroxylon inerme 176
 Siphonochilus aethiopicus 126
 Sisymbrium burchellii 77, 88
 Sisymbrium dissitiflorum 88
 Sisymbrium sparteae 84
 Smodingium argutum 28
 SOLANACEAE 55, 60, 72, 84, 92, 105, 116
 Solanum africanum 116
 Solanum crossifolium 116
 Solanum damarense 92
 Solanum dinteri 84
 Solanum litoraneum 55, 60, 105
 Solanum resicentoides 84
 Solanum torreanum 55
 Solenopsis conica 42
 Sophora velutina 180
 Sorindeia undulata 149
 Sparrmannia ricinocarpa 26
 Spermacoce annua 144
 Spermacoce bangweolensis 144
 Spermacoce kirkii 52
 Spermacoce perennis 144
 Spermacoce princeae 155
 Spermacoce samfya 155
 Spermacoce schlechteri 60
 Sphaeranthus epigaeus 88
 Sphaeranthus wattii 88
 Spiloxene canaliculata 101
 Spiloxene curculigoides 112
 Spiloxene declinota 112
 Spiloxene linearis 112
 Spiloxene maximiliani 101
 Spiloxene minuta 101
 Spiloxene serrata 112
 Spiloxene umbraticola 101
 Spiloxene sp. 112
 Sporobolus bechuanicus 20
 Stachys aethiopica 132
 Stachys arachnoidea 132
 Stachys didymantha 36
 Stachys dinteri 81
 Stachys natalensis 132
 Stachys simplex 132
 Stachys tubulosa 132
 Stadmannia oppositifolia 176

Stangeria eriopus 53
 Stapelia cylista 178
 Stapelia flavopurpurea 75
 Stapelia gariepensis 75
 Stapelia gettiffei 171
 Stapelia gigantea 145, 178
 Stapelia hirsuta 87
 Stapelia kwebenensis 75, 171
 Stapelia longipedicellata 75
 Stapelia pearsonii 65
 Stapelia schinzii 75, 87
 Stapelopsis neronis 65
 Stapelopsis urniflora 87
 Stapiflora zambesensis 148
 Steirodiscus schlechteri 100
 Steirodiscus speciosus 100
 Stenodiopsis eylesii 182
 Stenodiopsis glandulosa 144
 Stenoglossum longifolia 115
 Sterculia africana 84
 Sterculia appendiculata 52
 Sterculia murex 134
 Sterculia quinqueloba 52
 Sterculia schliebenii 55
 STERCULIACEAE 38, 52, 55, 60, 72, 84, 134, 155
 Stictocardia laxiflora 111
 Stigmatophrynus hereroensis 75
 Stipagrostis damarensis 83
 Stipagrostis garubensis 83
 Stipagrostis gonatostachys 83
 Stipagrostis hermannii 83
 Stipagrostis hochstetteriana 83
 Stipagrostis namibensis 83
 Stipagrostis sabulicola 83
 Stoeberia carpii 91
 Stolzia compacta 37, 168
 Stolzia nyassana 37
 Stolzia williamsii 42
 Streblus usambarensis 166
 Streptocarpus brachynema 50
 Streptocarpus confusus 125, 128
 Streptocarpus cyanandrus 180
 Streptocarpus cyaneus 132
 Streptocarpus daviesii 125
 Streptocarpus davyi 125
 Streptocarpus dolichanthos 39
 Streptocarpus dunii 128
 Streptocarpus grandis 50
 Streptocarpus hirtinervis 39
 Streptocarpus leptopus 39
 Streptocarpus michelmorei 50
 Streptocarpus micranthus 128
 Streptocarpus milanjanus 39
 Streptocarpus myoporoides 50
 Streptocarpus nimbicola 36
 Streptocarpus penterianus 132
 Streptocarpus polyanthus 132
 Streptocarpus wilmsii 125
 Streptocarpus sp. 146
 Streptopetalum luteoglandulosum 144
 Striga diversifolia 60
 Strophanthus amboensis 75
 Strophanthus angustii 145
 Strophanthus courmontii 162
 Strophanthus eminii 140
 Strophanthus hypoleucos 56
 Strophanthus kombe 87
 Strophanthus nicholsonii 171
 Strumaria aestivalis 97
 Strumaria barbae 64, 108
 Strumaria bidentata 64, 108
 Strumaria chaplinii 97
 Strumaria discifera 108
 Strumaria hardyana 64
 Strumaria karoica 108
 Strumaria karoopoortensis 108
 Strumaria leipoldtii 97
 Strumaria massoniella 108
 Strumaria merxmulleriana 108
 Strumaria perryae 97
 Strumaria pholothicha 64
 Strumaria picta 108
 Strumaria pubescens 108
 Strumaria pygmaea 108
 Strumaria salterii 108
 Strumaria spiralis 108
 Strumaria unguiculata 97
 Strumaria villosa 108
 Strumaria watermeyeri 108
 Struthiola anomala 106
 Struthiola congesta 117
 Struthiola montana 177
 Struthiola pondensis 117

Struthiola rhodesiana 177
 STRYCHNACEAE 148
Strychnos angolensis 165
Strychnos mellodora 166
Strychnos mitis 166
Strychnos myrtoides 58
Strychnos xantha 148
Suaeda articulata 78
Suaeda merxmulleri 88
Suaeda salina 66
Suaeda sp. 49
Suessenguthiella caespitosa 71
Suregada procera 165
Suregada zanzibariensis 165
Sutero botolipino 20
Sutero concinno 20
Sutero fodina 177
Swynnertonia cardine 178
Synadenium cupulare 132
Synaptophyllum juttiae 82
Syncarpha recurvata 100
Syncolostemon comptoni 125
Syncolostemon concinnus 128
Synsepalum kaessneri 169
Synsepalum muelleri 42
Syzygium masukuense 54

T

Taeniophyllum coxii 37
Tannodia swynnertonii 165
Tapinanthus forbesii 133
Tapinanthus gracilis 133
Tapinanthus mollissimus 90
Tapinanthus oleifolius 81
Tapinanthus rubromarginatus 133
Tapiphyllum cinerascens 148, 155
Tapiphyllum cistifolium 155
Tapiphyllum molle 148
Tapiphyllum rhodesiacum 148
Tavnesia barklyi 162
Teclea crenulata 60
Teclea fischeri 176
Teclea gerrardii 134
Teclea natalensis 134
Teclea pilosa 134
 TECOPHILAEACEAE 84
Tephrosia aequilata 58
Tephrosia albissima 133
Tephrosia brummittii 133
Tephrosia capensis 133
Tephrosia chimanimaniana 180
Tephrosia cordata 129
Tephrosia coronilloides 145
Tephrosia elongata 180
Tephrosia festina 180
Tephrosia forbesii 58
Tephrosia gobensis 129
Tephrosia grandiflora 129
Tephrosia griseola 90
Tephrosia kasikienis 142
Tephrosia kraussiana 129
Tephrosia longipes 180
Tephrosia lurida 180
Tephrosia monophylla 80
Tephrosia muenzneri 152
Tephrosia natalensis 133
Tephrosia pallida 90
Tephrosia retusa 133
Tephrosia richardsiae 146
Tephrosia robinsoniana 152
Tephrosia rupicola 180
Tephrosia whyteana 39
Tephrosia zambiana 152
Ternstroemia polypetala 38
Tetragonia rangeana 86
Tetragonia schenckii 74
Tetrapogon tenellus 91
Tetralia brachyphylla 112
Tetralia compacta 112
Tetralia compressa 112
Tetralia milanensis 35
Tetralia notolensis 131
Tetralia paludosa 119
Tetralia robusta 112
Thaminophyllum latifolium 110
Thaminophyllum multiflorum 110
Thaminophyllum mundii 110
Thamnocalamus tessellatus 26, 133
 THEACEAE 38
Thesium bundiense 176
Thesium chimanimaniense 176
Thesium dissitum 20

Thesium dolichomeris 176
Thesium gracilentum 134
Thesium megalocarpum 92
Thesium whyteanum 42
Thesium xerophyticum 83
Thespesiopsis mossambicensis 58
Thorncroftia longiflora 128
Thorncroftia thorncroftii 132
Thunbergia petersiana 178
Thunbergia pondensis 127
Thunbergia reticulata 178
Thunbergia schimbensis 178
Thunbergia subulata 178
 THYMELAEACEAE 30, 42, 105, 116, 120, 177
 TILIACEAE 26, 55, 60, 84, 92, 148, 155
Tinnea barbata 128
Tinnea galpinii 128
Tinospora mossambicensis 58
Torenia monroi 182
Trachyandra asperata 131
Trachyandra ensifolia 76
Trachyandra glandulosa 87
Trachyandra lanata 87
Trachyandra peculiaris 65
Trachycalymma fibrinatum 179
Trachycalymma graminifolius 171
Tragia glabrata 57
Tragia mazoensis 180
Tragia micromeres 141
Tragia prostrata 141
Tragia shirensis 57
Tragiella friesiana 141
Trema orientalis 72
Triainolepis sancta 60
Trianoptiles solitaria 100
Trianoptiles stipitata 112
Trianthema hererensis 74
Triaspis dumeticola 180
Triaspis lateriflora 153
Triaspis nelsonii 51
Triaspis suffulta 58
Tribulocarpus dimorphanthus 74
Tricalysia accocantheroides 169
Tricalysia coriacea 38
Triceratella drummondii 50, 163
Trichocladus ellipticus 165
Trichocladus goetzei 36
Trichogyne lerouxiae 110
Trichoscypha ulugurensis 161
Tricliceras auriculatum 52
Tricliceras elatum 52
Tricliceras laceratum 134
Tricliceras lanceolatum 52
Tricliceras longipedunculatum 52, 134
Tridactyle bicaudata 168
Tridactyle citrina 37
Tridactyle translucens 154
Tridactyle trimlicorum 168
Tridactyle verrucosa 42
Tridactyle virginea 42
Tridentea marientensis 75
Triplochiton zambesiacus 146
Tripteris nervosa 77
Tritonia moggii 57
Triumfetta grandistipulata 155
Triumfetta reticulata 156
Triumfetta tenuipedunculata 148
Trochomeria subglabra 150
Troglodyton accosianum 110
Tromotriche aperta 87
Tryplostemma porvifolium 181
Tulbaghia tenuior 86
Turbina longiflora 50
 TURNERACEAE 52, 134, 144, 148
Turroea eylesii 180
Turraea fischeri 180
Turraea floribunda 133
Turraea zambesica 81, 146
Tylecodon aridimontanus 67
Tylecodon aurobergensis 67
Tylecodon bleckiae 89
Tylecodon buchholzianus 67
Tylecodon hallii 67
Tylecodon paniculatus 88
Tylecodon pearsonii 79
Tylecodon racemosus 67
Tylecodon reticulatus 89
Tylecodon rubrovenosus 78
Tylecodon schaeferianus 78
Tylecodon similis 89
Tylecodon singularis 67
Tylecodon walchii 67
Tylophora fleckii 76

U

ULMACEAE 72, 126, 169, 177
Urginea saniensis 25
Ursinia coronopifolia 111
Ursinia pygmaea 111
Ursinia subflosculosa 111
 URTICACEAE 84, 156
Uvaria edulis 140
Uvaria gracilipes 171
Uvaria lucida 127
Uvarioidendron sp. 56

V

Vahlia capensis 52, 84
 VAHLIACEAE 52, 84
Vangueria volkensii 155
Vanilla polylepis 168
Vanilla roscheri 102
Vellereophyton felinum 100
Vellereophyton gracillimum 111
Vellereophyton lasianthum 100
Vellereophyton pulvinatum 100
Vellozio orgenteo 177
 VELLOZIACEAE 38, 126, 148, 177
Vepris allenii 60
Vepris drummondii 169
Vepris elegantissima 38
Vepris fanshawei 155
Vepris mendoncana 148
Vepris termitaria 144
Vepris whitei 155
 VERBENACEAE 72, 84, 134, 156, 169
Vernonia accommodata 172
Vernonia africana 100
Vernonia bainesii 172
Vernonia eylesii 172
Vernonia fractiflexa 35
Vernonia glabra 88
Vernonia gracilipes 172
Vernonia graniticola 163
Vernonia helodea 38
Vernonia inhacensis 56
Vernonia kawoziensis 35
Vernonia lycioides 149
Vernonia madefacta 149
Vernonia milaniana 35
Vernonia muelleri 49, 172
Vernonia mushituensis 145
Vernonia mutimushii 140
Vernonia najas 140
Vernonia nepetifolia 172
Vernonia obionifolia 77
Vernonia rhodesiana 179
Vernonia tanganyikensis 145
Vernonia wildii 172
Vernonia zambiana 140
Vigna comosa 142
 VIOLACEAE 169, 177
 VISCACEAE 52, 84, 92
Viscum capense 84
Viscum dielsianum 92
Viscum littoreum 52
Viscum menyhartii 92
Viscum rotundifolium 84
Viscum schaeferi 84
Viscum tuberculatum 84
 VITACEAE 52, 60, 72, 84, 92, 144, 148, 156, 169, 177, 182
Vitellariopsis dispar 126
Vitellariopsis ferruginea 176
Vitex rehmannii 134
Vittaria elongata 169
Vittaria ensiformis 170
 VITTARIACEAE 42, 169
Voacanga africana 162
Volkella disticha 67, 151

W

Wahlenbergia adamsonii 111
Wahlenbergia androsacea 77, 111
Wahlenbergia annuliformis 119
Wahlenbergia asperifolia 119
Wahlenbergia bolusiana 119
Wahlenbergia bowkeriae 119
Wahlenbergia brachycarpa 111
Wahlenbergia brachyphylla 111
Wahlenbergia brehmeri 100
Wahlenbergia buseriana 119
Wahlenbergia cephalodina 150

Wahlenbergia cernua 111
Wahlenbergia cilioloto 111
Wahlenbergia compacta 119
Wahlenbergia constricta 111
Wahlenbergia cuspidata 111
Wahlenbergia debilis 119
Wahlenbergia densicaulis 88
Wahlenbergia distincta 119
Wahlenbergia divergens 119
Wahlenbergia doleritica 28
Wahlenbergia dunantii 119
Wahlenbergia ecklonii 111
Wahlenbergia effusa 119
Wahlenbergia erophioides 77
Wahlenbergia floribunda 119
Wahlenbergia kowiensis 111
Wahlenbergia lasiocarpa 119
Wahlenbergia levynsiae 111
Wahlenbergia longisepala 119
Wahlenbergia massonii 119
Wahlenbergia microphylla 100
Wahlenbergia minuta 111
Wahlenbergia mollis 119
Wahlenbergia namaquana 111
Wahlenbergia oligantha 119
Wahlenbergia oligotricha 119
Wahlenbergia pinnata 111
Wahlenbergia polyantha 111
Wahlenbergia polyclada 119
Wahlenbergia ramifera 119
Wahlenbergia ramossima 140
Wahlenbergia rara 119
Wahlenbergia riversdalensis 111
Wahlenbergia roelliflora 119
Wahlenbergia rotundifolia 100
Wahlenbergia saxifragoides 119
Wahlenbergia schistacea 119
Wahlenbergia serpentina 119
Wahlenbergia subpilosa 119
Wahlenbergia subtilis 119
Wahlenbergia subumbellata 88
Wahlenbergia swellendensis 111
Wahlenbergia tetramera 100
Wahlenbergia tomentosa 119
Wahlenbergia tumida 119
Wahlenbergia umbellata 100
Wolofrido goetzei 182
Warburgia salutaris 35, 49, 124, 163
Warneckea sansibarica 166
Watsonia bella 128
Welwitschia mirabilis 84
 WELWITSCHIACEAE 84
Whiteheadia bifolia 90
Widdingtonia nodiflora 173
Widdingtonia whytei 35
Wimmerella bifida 120
Wimmerella longitubus 101
Wimmerella mariae 112
Woodia singularis 131
Wrightia natalensis 171

X

Xerophyta argentea 177
Xerophyta splendens 38
Xerophyta villosa 126, 148
Ximenia americana 82
Ximenia 82
Xylia mendoancae 51
Xylia torreana 54
Xylopia collina 49
Xylopia odoratissima 74, 127, 171
Xylopia parviflora 130
Xylopia torrei 54
 XYRIDACEAE 42
Xyris makuensis 42

Z

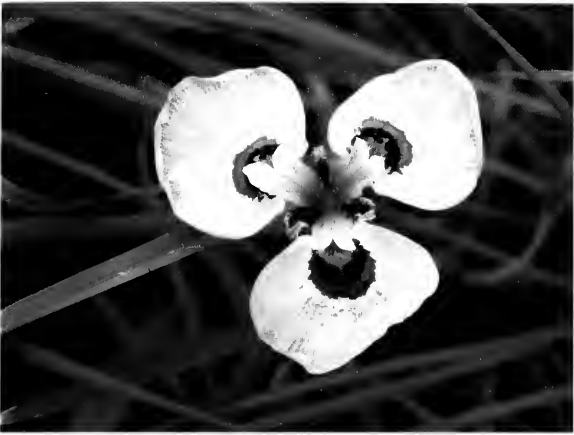
Zaluzianskya oreophila 27
 ZAMIACEAE 38, 52, 55, 126, 170
Zamioculcas zamiifolia 162
Zanthoxylum davyi 169
Zanthoxylum deremense 38
Zanthoxylum gillettii 169
Zehneria scabra 164
Zeuxine africana 20, 102
Zeuxine ballii 37
 ZINGIBERACEAE 126
Ziziphus pubescens 59
 ZYGOPHYLLACEAE 72, 84, 92
Zygophyllum applanatum 84

Zygophyllum chrysoteron 92
Zygophyllum clavatum 84
Zygophyllum cordifolium 84
Zygophyllum cretaceum 84
Zygophyllum cylindrofolium 84
Zygophyllum decumbens 85
Zygophyllum giesii 72
Zygophyllum hirticaule 85

Zygophyllum inflatum 72
Zygophyllum leptopetalum 85
Zygophyllum leucocladum 85
Zygophyllum longicapsulare 85
Zygophyllum longistipulatum 85
Zygophyllum macrocarpum 72
Zygophyllum microcarpum 85

Zygophyllum morganiana 85
Zygophyllum patenticaule 85
Zygophyllum prismatocarpum 85
Zygophyllum pterocaulis 72
Zygophyllum pubescens 85
Zygophyllum retrofractum 85
Zygophyllum rigidum 85

Zygophyllum schreberianum 72
Zygophyllum segmentatum 72
Zygophyllum simplex 85
Zygophyllum spongiosum 85
Zygophyllum stapfii 85
Zygophyllum tenue 85
Zyphelis decumbens 100



Moraea aristata, South Africa.
(Photo: NBI)



Erica porteri, South Africa.
(Photo: NBI)



Zambezi Rapids, Zambia. (Photo: J. Burrows)



Landscape of Nyanga (World's View), Zimbabwe.
(Photo: J. Timberlake)



Daubenya aurantiaca var. *coccinea*, South Africa.
(Photo: NBI)



Bauhinia natalensis, South Africa. (Photo: NBI)

About SABONET

This publication is a product of the Southern African Botanical Diversity Network (SABONET), a programme aimed at strengthening the level of botanical expertise, expanding and improving herbarium and botanic garden collections, and fostering closer collaborative links among botanists in the southern African subcontinent.

The main objective of SABONET is to develop a strong core of professional botanists, taxonomists, horticulturists, and plant diversity specialists within the ten countries of southern Africa (Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia and Zimbabwe). This core group will be competent to inventory, monitor, evaluate, and conserve the botanical diversity of the region in the face of specific development challenges, and to respond to the technical and scientific needs of the Convention on Biological Diversity.

To enhance the human resource capacity and infrastructure available in the region, SABONET offers training courses, workshops, and collaborative expeditions in under-collected areas. The programme produces a newsletter, *SABONET News*, and a series of occasional publications, the *Southern African Botanical Diversity Network Report Series*, of which this publication is part.

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6. *†Southern African herbarium needs assessment. G.F. Smith, C.K. Willis and M. Mössmer. July 1999. 88 pp. ISBN 1-919795-45-6.
7. *A checklist of Namibian plant species. P. Craven (ed.). November 1999. 206 pp. ISBN 1-919795-37-5.
8. †Index herbariorum: southern African supplement. Second edition. G.F. Smith and C.K. Willis. December 1999. 181 pp. ISBN 1-919795-47-2.
9. *Making your garden come alive!—Environmental interpretation in botanical gardens. Marijke Honig. May 2000. 96 pp. ISBN 1-919795-50-2.
10. †Plant taxonomic expertise—An inventory for southern Africa. M. Mössmer and C.K. Willis. July 2000. 350 pp. ISBN 1-919795-53-7.
11. *Southern African botanical gardens needs assessment. D.J. Botha, C.K. Willis and J.H.S. Winter. November 2000. 156 pp. ISBN 1-919795-54-5.
12. Action Plan for Southern African Botanical Gardens. C.K. Willis and S. Turner. 2001. 35 pp. ISBN 1-919795-61-8.
13. Conspectus of Southern African Pteridophyta. J.P. le Roux. 2001. 223 pp. ISBN 1-919795-58-8.

* Out of print.

† Available in PDF format on the SABONET web site: <http://www.sabonet.org/publications/download.htm>

Species that are threatened with extinction mean different things to different people, and to some, it may have no significance whatsoever. In southern Africa, many people are likely to reflect on plant species losses in terms of what it represents to sustainable resource extraction and yield maximisation. Others see species loss in terms of population declines that bring about irreversible degeneration of species and their critical habitats, which in turn leads to an ecological snowball effect; there are others who associate species losses with collapsing formal and informal economies. Whether we regard threatened species in a socio-economic or scientific context, does not really matter. What does matter, is how we choose to deal with species in decline.

The *Southern African Plant Red Data Lists* presents plant Red Data Lists for ten southern African countries: Angola, Botswana, Lesotho, Malawi, Mozambique, Namibia, South Africa, Swaziland, Zambia, and Zimbabwe. About 3,900 plant and tree species for this vast region are classified here into various categories of extinction risk according to internationally used principles laid down by the World Conservation Union (IUCN).

Measures for coping with species losses need to be dealt with at social, economic, and political levels. Until the notions of threatened plants and threatened ecosystems become firmly entrenched within developmental agendas, efforts at retaining species for economies and the benefit of future generations will yield little. To this end, the *Southern African Plant Red Data Lists* serves as both a technical and a political document—it offers a practical conservation dimension that can be integrated into more sustainable socio-economic agendas for the southern African region.



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